VOL. XIX NEW YORK—THURSDAY, OCTOBER 29, 1908—CHICAGO No. 18

THE AUTOMOBILE

American Winner of Vanderbilt Race

1st—LOCOMOBILE - - - - 4:00:48⅕
George Robertson
2d—ISOTTA - - - - - - - - - 4:02:36⅖
Herbert Lytle
Average Speed - - - - - - 64.3 m. p. h.
Fastest Lap - - - - - - - - 69.4 m. p. h.

AMERICA has at last come into her own. An American car, designed by an American, built by Americans in an American factory, of American material, and driven by an American, finally won America's classic contest in this the fourth year of the stubborn perseverance of Americans to place American cars on a speed level with the product of Europe.

The Vanderbilt Cup race of 1908 has been run and won by a Locomobile, designed by A. L. Riker, built

The Isotta, Lytle Driving, Which Finished in Second Place, With a Fine Record for Consistency.

by the Locomobile Company of America, and driven by George Robertson, of New York, Saturday, October 24, over eleven laps of a 23.46 miles course, an out-and-out American combination evolved a triumphant winner. The 258.06 miles, made up of Nassau county roads, except for some nine miles to the round of the Long Island Motor Parkway's cement stretch so far completed, was covered in 4:00:48 1-5. The fastest lap of the race, 20:17, an average of 69.49 miles per hour, also was credited to the Locomobile. The average scored was 64.38 miles per hour, a new record for American roads, beating the previous best record of 64.25 miles, made by Herbert Lytle with the Isotta in the Motor Parkway Sweepstakes over the same course two weeks before. More to the point, however, is that the result of the race transfers not only an American record held by a foreign car with an American driver, but also a hitherto best Vanderbilt Cup average, scored by an out and out European combination, to an utterly American aggregation; for the Locomobile and Robertson also beat the 61.49 miles average scored by the Darracq and Hemery in the 1905 race.

The average put up by the Locomobile and Robertson far outstripped the other records of this season's road races in this country, in addition to the Sweepstakes figures. Louis Strang, in the triple-winning Isotta, averaged 50.70 miles at Savannah, 46.15 miles at Briarcliff, and 53.6 miles at Lowell.

The runner up Cup honors fell to the Isotta, hitherto unbeaten in any road race this year. With Herbert Lytle at the wheel, this marvellous little racing craft finished in 4:02:38 2-5, with an average of 63.88 miles per hour, but a fraction below its record performance in the Parkway Sweepstakes. It lost first honors by but 1 min. 48 1-5 sec., putting up the closest race in the history of American long-distance racing, surpassing even the closeness of the memorable struggle between George Heath and Albert Clement in the first Vanderbilt event.

Following Lytle's finish the crowd swarmed over the homestretch and was reported as also to have overrun the outlying course. Accordingly, Referee Vanderbilt called the race off as a precautionary measure of safety. Two pilots, however, threaded their way through the maze of people and finished. They were Walter Luttgen in W. K. Vanderbilt, Jr.'s, Mercedes and "Jim" Florida in Locomobile No. 1. Unofficial but reliable timing gave 4:30:35 to Luttgen, who had crossed the line unhampered. On the other hand Florida was hemmed in by the crowd and long delayed. There would seem to be no doubt of his having finished third. Allowing him three minutes for his delay, his time would be 4:28:10. Even had but two minutes' delay been granted him, he would still have finished ahead of the Mercedes pilot.

In enthusiasm and enormous attendance, it was the same old Vanderbilt Cup race. As a contest it was the best race ever run for the cup and the fiercest fought battle an American road race has ever produced. At the end of the seventh round, when 164.22 miles had been run, ten contestants were still fighting it out. Six of them at this point had yet winning chances, less than 15 minutes separating the leader from the tail-ender of the sextette. These ten were still running when the race ended.

George Robertson and Willie Haupt divided the honors of leadership, the Locomobile setting the pace for three rounds and then the Chadwick captured the running for the next three laps. The Locomobile had experienced slight delays, but they were sufficient to put it back in the ruck, so close was the contest among the leaders. Throughout the race the Isotta, running steadily and consistently from start to finish under Lytle's able pilotage, never lost its position in the pacemaking trio. Emile Stricker was also in frequent evidence in second and third place with Robert Graves's Mercedes until the tenth round, when the Mercedes entered by the cup donor got a grip on third place that was not shaken off until the last lap.

Robertson gained the lead in the seventh lap. The last five laps of the race was made up of an exciting duel between the Locomobile and the Isotta with from but two to four minutes separating them at any time. Robertson entered the last lap with but 3 min. 50 sec. to his credit over Lytle. Soon after word came that the Locomobile had stopped near Jericho on the backstretch. The grandstand was thrown into a turmoil of excitement and fairly seethed with suspense until a second megaphone bulletin told of his being off again with but a loss of about two minutes he had taken to replace a tire.

When Lytle and his Isotta had flashed by the stand first past the post, there followed minutes of anxious waiting and pent-up excitement that no race ever run in America before had ever called forth. Robertson had started ten minutes after Lytle and so had that margin in which to finish. Watches were out and anxious eyes shifted from them to the hill up the stretch. Five, six, seven minutes passed and no Robertson. Eight minutes, and a mighty shout went up as the big radiator of the Locomobile showed itself over the hilltop. It took but seconds for Robertson to dash down the homestretch and across the tape.

There were seconds of tense waiting for the final word from the timers' stand. It came and then there arose such a mighty whole-souled cheer and shout of triumph from the grandstand

and the thousands along the homestretch as no Vanderbilt Cup finish had ever called forth before. It was a mighty howl of glee and victory over America's first great road racing triumph. That stupendous cheer raised the curtain on a new era for America in international racing. Long patience and stubborn perseverance had at last won out and America was no longer a second-rater among the motor car racing nations of the world.

A wet course during the early stages of the race interfered somewhat with the speed attained by the contenders, otherwise the record would doubtless have been beaten by a broader margin than it was. It had rained for two hours before the start and the rain continued well into the second round.

Though the new course was less accessible than the old circuit and the location of the grandstand was remote and unfamiliar, as has been said above, the same old monster Vanderbilt Cup race crowd was in evidence. It probably did not equal the mighty throng that swamped Nassau county in 1906, but it reached the hundred thousands and maintained the prestige of the Vanderbilt Cup as America's greatest sporting event.

The race was utterly without fatalities and absolutely free from injuries to contestants beyond the singeing of Foxhall Keene's moustache during his attempt to put out a fire on his Mercedes. In fact, an accident apiece to cars and spectators was the sum total of casualties to onlookers. "Jim" Florida at the finish bumped into a touring car and damaged its radiator and in the mix-up a young man was thrown to the ground and had his leg broken.

To tell the unvarnished truth, the preparations that had been made to handle the crowd and guard the course proved to be inadequate. The instinct of self-preservation did more to save the crowd from injury than did the private militia company that had been obtained or the Pinkerton men and the deputies that had been hired. There was an insufficient number of guards to make the wire fence barrier efficient. Hundreds scaled it and crowded those that had paid big prices for choice parking spaces along the homestretch. At the finish there was a rush of hundreds to the space in front of the grand and official stands. The supply pit hose pipes were brought into play with some momentary success, but they only checked the onrush temporarily and then the homestretch was again overrun, and Referee Vanderbilt was compelled for safety's sake to call the race off with the passing of the victor by the tape. There was also confusion anent the directions for reaching the parkway entrances and parking spaces. To most automobilists the region of the parkway and the location of the toll gates were unfamiliar. As these entrances had to be reached at night time, the route to them might have been indicated by guiding signs along the various roads of approach.

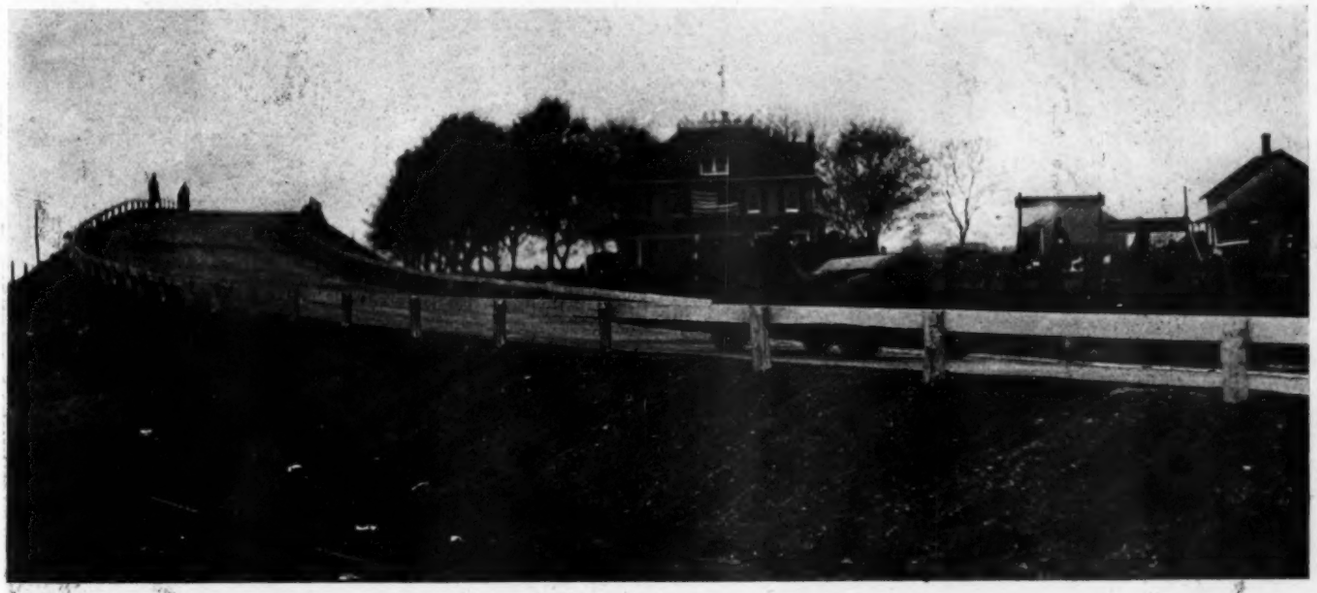
The arrangements for the conduct of the race itself and the convenience of officials and newspaper men, however, left no ground for complaint. The telegraph and telephone service on the press stand were pronounced adequate by the scores of newspaper men who had come from all sections of the country.

So far as crowds of foot passengers and numbers of automobiles went, the Vanderbilt Cup race of 1908, generally speaking, was not behind the average of its predecessors. No guesser with any regard for truth and reason will attempt to assert that the throngs of people and cars equaled or even approached the attendance at the cup race of 1906, when transit facilities were swamped, and for a week before the race there was a steady pouring of machines into town from a radius of 500 miles.

The absence of the foreign makers and drivers from the contest resulted in a falling off of visitors from distant points, and, of course, of parties that toured to Long Island. Still all automobiledom in the metropolitan district was on hand with its cars and that means the Greater New York and nearby Jersey furnished fully fifteen thousand machines. The daily newspaper guesses at the crowd hovered around 200,000, but that was, of course, mere guess work. There were fully 5,000 people in the grandstand and easily twice as many more packed along the homestretch in its immediate vicinity. There were thousands gathered at each of the towns and turns, and all around the circuit was a fringe of onlookers.

The road race goers of New York demand the novelty and adventure of an all night pilgrimage or encampment. They would not leave at 6 o'clock to see the start of the Sweepstakes at 9 o'clock. They welcomed the chance, however, to camp out all night on Long Island, or to start from the Rialto at midnight to see the Vanderbilt Cup race.

There were the same old familiar midnight scenes in the Broadway hotels and cafes, the late suppers, and the early breakfasts of the sporty element that was out for a racket and wanted to make sure of being properly keyed up. During the night two bridges and two ferry companies transported considerably over 4,000 cars. Add to these fully as many more that drove to the course from Broadway and then include the thousands of machines that had traveled to Long Island during the week, or had started earlier in the afternoon to put up at the various Nassau county hotels and farm houses, and the estimate of 15,000 cars to view the race would not seem to be an exaggeration.



Unofficially, the Third Car Was Undoubtedly No. 1 Locomobile, Driven by Florida, Which Ran Into Unruly Crowd Near Grandstand.

THE VANDERBILT BOX

A.C.A. PRESENT AND PAST JUDGE E.H. GARY AND COLGATE HOYT

MR. AND MRS. W.K.V. JR.

CUP DONOR SHARES WITH MRS. W.K.V. JR.

E.R. THOMAS AND CUP DONOR HAVE A TALK. MAJOR CROWLEY IN COMMAND

MRS. CHAIRMAN THOMPSON STUDIES THE SCORE

FOUR NOTABLES: THOMPSON, GARY, VANDERBILT, McADOO.

ROBERT GRAVES HEARS FOXHALL KEENE'S EXPERIENCES

How the Race Was Contested Won, and Lost

THE weather-wise man at Washington had forecasted rain. But not a drop of it came during the long night, in which the mechanics and motor sharks were busy with the final touches to their charges at the training camps around the circuit, and there were hopes of a dry day and course for the race after all. But at half past four o'clock, when the captains of the camps had just about called from dreams of conquest and glory and nightmares of punctured tires and magnetos that would furnish no spark the men on whose courage and skill the fate of each little army was to depend, the dread drops began to fall and soon developed into a steady and what seemed a hopeless rain. There was a hustling for rubber togs and a digging out of anti-skids. Within the next hour the racing machines were en route to the course and the squads of tire tossers and oil jugglers to their places at the grandstand pits and the backstretch supply station.

The first cup candidate to reach the starting line was George Salzman in the Thomas, who got there at half past five o'clock. Others followed in quick succession and soon the number was sufficient for "Wag" to begin his task of getting them in their places in the starting line. Referee Vanderbilt and Chairman Thompson were also on hand in water-proof jackets, "knickers," and "puttees" to answer a hundred questions. Long before 6.21 A. M., the hour originally set for the start, the hustling starter had the cup candidates lined up. Then came the announcement that the start would be made at 6.30. The rain had ceased, but threatening clouds dimmed the dawn. Even at this hour the boxes and stand were well filled and black lines of intruding thousands swarmed among the hundred automobiles to the east and stretched in solid walls to the hill to the west a half a mile away.

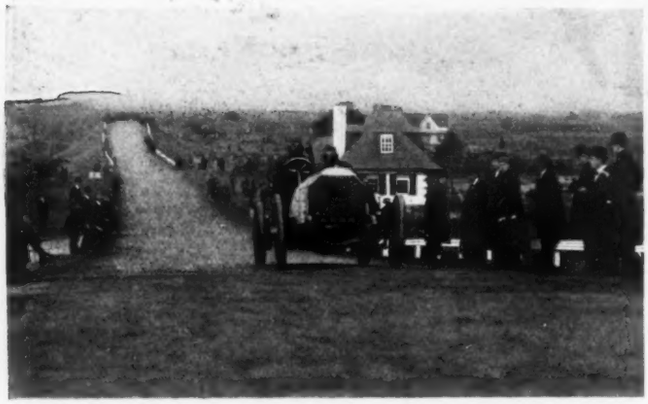
As the appointed hour grew near, the starter took his stand beside Locomobile No. 1. Charley Dieges and Sam Butler were near with chronometer and note book. This time it was good old Yankee "ten, nine, eight," and not "dees, nuff, weat, set," etc., on which "Wag" prided himself at former races, for this time a bunch of American pilots unadulterated by any famous foreign mixture were to be sent away.

"Seven, six, five, four, three, two, go" and Jim Florida was off and the great race of 1908 was on. There was applause as each car shot away, but the first big cheer went to Lytle, who was sixth to start. Ryall, Seymour, and Kilpatrick were dispatched in order without incident. Then came a gap, for Pouget and the Brasier were missing. En route to the course Mr. Whitney's car had had the ill-luck to break its steering gear. Robertson, the favorite, got away amid a mighty roar of encouragement and well-wishing. Hardly less of a demonstration started for Strang, but it was nipped in the bud by the inability of his mechanic to crank the Renault. There was a scurrying of camp followers to the rescue, a lifting of the bonnet, and further desperate cranking, but still the stubborn spark could not be coaxed into life. It was time for the next "get-away" and the referee hastened to assist with willing shoulder to push the car to the side of the course. Magneto trouble had been its undoing. During Strang's absence in town the evening before, so the story goes, a new magneto had been put in. At the start its interrupter had panned out defective and refuse to work. Finally, in despair the car was pushed back to the Renault pit. Twenty-eight minutes later it was gotten going at last and Strang started with a hopeless half hour handicap to make up. Strang and La Croix are popular and the tardy luckless Renault that suffered misfortune through accidents in both the Brighton Beach races got a cheer of good fellowship.

First Lap (23.46 Miles).—With all the seventeen cars under way came a craning of necks up the stretch for the first car that should heave into sight. There was less than five minutes of waiting, for at 6.53.10 "Jim" Florida in the pacemaking Locomobile shot by, having completed the round in 23:10. Next Stricker in Mr. Graves's Car, the Jenatzy Mercedes having overhauled and passed the Dennison Knox, which had started second. "Willie" Haupt was also burning up the road with the Great Chadwick and had also gotten by the Knox. All the time Robertson was climbing up the steps of the racing ladder, and though Chevrolet, too, was hitting a hot pace with the Matheson and had started a minute a head of the Locomobile, it was cut down by the favorite. Word came from the backstretch that Mercedes No. 18 was afire, the gasoline having ignited. It was another case of bad luck for Foxhall Keene, who in 1905 race had banged into a telegraph pole on the hairpin turn. He finally extinguished the flames and finished his first lap after the leaders had completed a couple of circuits.

Robertson completed his first round in 20:54 and in actual time was the leader in the race. As he finished his lap he slowed down to his pit to take on water and oil. It was feared from his seeking fuel so early that his engine was heating, but he was up and away again in less than two minutes. Already Robertson had gathered a margin of but a couple of seconds less than a minute on his nearest pursuer, the Isotta. Lytle and Haupt had had a neck and neck race for the place, the former capturing it by a second. They were being chased by Chevrolet and Salzman less than fifteen seconds behind them, the Thomas leading the Matheson by but fire seconds. Florida, Patschke, and Luttgen followed in order. The field was running well, only Keene have encountered any obstacle. Despite the slippery going, the leading trio were running among the records, Robertson with an average of 67:3, and Lytle at a 64:50 miles rate.

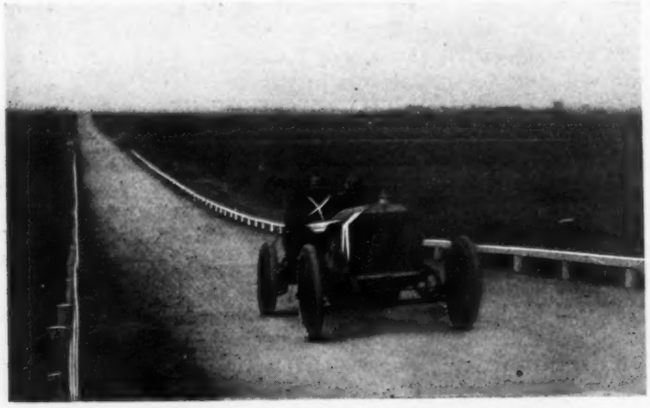
Second Lap (46.92 Miles).—The speed honors of the second round fell to Haupt and Lytle. The Chadwick by a lap in 21:29 made up the one second lead and gained 4 seconds besides on the Isotta. Stricker was making a splendid run in the Mercedes and put up a 21:58 lap to his credit. Despite his stop for water, which came out of the second lap, Robertson had spurted so hard that his gross for the round showed 22:15, and he still held the lead by a margin of 15 seconds. Florida, too, was well holding up his end of the Locomobile plank in fifth place, and Salzman and the Thomas hung stubbornly to the sixth. This sextette was running with a margin of but three minutes separating the first and last man. The indomitable Keene made a plucky run after he had extinguished the fire in his carbureter,



Vanderbilt Mercedes Ascending a "Hill" of the Parkway.

No. 2 Knox Overhauling No. 6 Grand Prix Thomas.

No. 12 Thomas Best of the Buffalo Trio.



No. 7 Matheson Which Had Its Share of Misfortune.

covering the second lap in 22:32. Strang had gotten the Renault going, but it was somewhat in the doldrums and no greater speed than 23:58 could be gotten out of it. In this round Chevrolet's fight in the Matheson was stopped for good by a cracked cylinder, and the Baltimore youth, Howard W. Gill, had his road racing début nipped in the bud by the gears of the Thomas refusing further to work. Chevrolet had made a fine first lap in 22:09, and the Matheson's downfall greatly disappointed those who had expected much from the new Matheson racer.

Third Lap (70.38 Miles).—It had rained a bit during the first lap, but had let up during the second. By the third round the sun, though veiled by mist, showed itself and set to work to dry out the course and made good progress. With his signal men informing him how close were the Isotta and the Chadwick at his heels, the daredevil in Robertson's make-up asserted itself and he put spurs to his motor steed. He had made laps in practice over a dry course in 20 minutes, but he still had a wet and slippery road ahead of him now. So daringly did he take the turns and so unerringly did he pilot his flyer down the straights along the country roads and over the "roller coaster" hills of the cement stretch, that he took unto himself the fastest lap in the race—a 23.46 mile round in 20:17, showing a rate of 69.6 miles per hour. Even at that rate of going the Chadwick in 21:27 was still but 25 seconds behind him, and the sure-footed Isotta less than two minutes to the bad. Stricker and Florida were holding stubbornly to fourth and fifth places, still pursued in order by Salzman and Luttgen. Both of the Knox machines were putting up an excellent race for stock cars of medium power, each gaining a place higher up in this round. In this circuit the Hotchkiss fell by the wayside with a broken clutch, and the Acme went out with broken gears. Kilpatrick had covered the first lap in 22:09, and Patschke had scored 23:23 for the same circuit.

Keene was well sustaining his reputation as America's crack amateur by his driving of his vetern Mercedes. He had made his second lap in 22:54. He bettered this in the third round by putting up a circuit in 22:18. There were mighty few professionals in the race beating the Long Island fox-hunter.

Fourth Lap (93.84 Miles).—In the fourth round Haupt put up the whirlwind lap that landed the Great Chadwick "six" in the lead and set the wise ones to wondering for this and two succeeding laps whether after all a dark horse might not spring a surprise on the much-touted trio of favorites and furnish the new American champion. Haupt had claimed for himself 20:40 in practice. Despite going that was not the best, he cut loose for fair and covered the course in 21:10. Lytle also got a few more notches of speed out of the Isotta and showed 22:04. In fact, the entire sextette of leaders ran this round at marvellous speed, Stricker scoring 22:23; Luttgen, 22:23, and Salzman, 22:31. Down among the luckless tail-enders Keene's light shone even more brightly than that of the vaunted leaders with a round in 22:10. All this hurrying and scurrying happened while Robertson was laid up at his pit at the grandstand looking after his tires. He put a new one on the rear wheel and shaped two others to his car for emergencies. It cost him a delay of over three minutes. This was enough, however, to put him into fourth place, so close were Haupt, Lytle, and Stricker at his heels. All this time Strang was plodding along way back in the ruck under a hopeless handicap of close to 30 minutes, incurred by his delay at the start. A burnt out clutch finally put him out of his misery and the race in this lap. The relentless law of compensation had gotten in its fine work at last on the winner of four straight road races and laid him low.

Fifth Lap (117.30 Miles).—Haupt continued his impressive run with the Chadwick and again in the fifth round scored the fastest time, 21:36. Further down the line Florida and Stricker were also putting in great licks of speed with rounds of 21:38 and 21:40. Lytle had slowed down to 23:28, and even Robertson with three cars still ahead of him was doing no better than 22:23. Stricker got by Lytle and Robertson failed to improve his position. In fact, Stricker's gain of a place was the

Six-cylinder Chadwick, Haupt at Wheel, Which Made a Most Creditable Showing Until Ignition Troubles Put It Out of the Running.

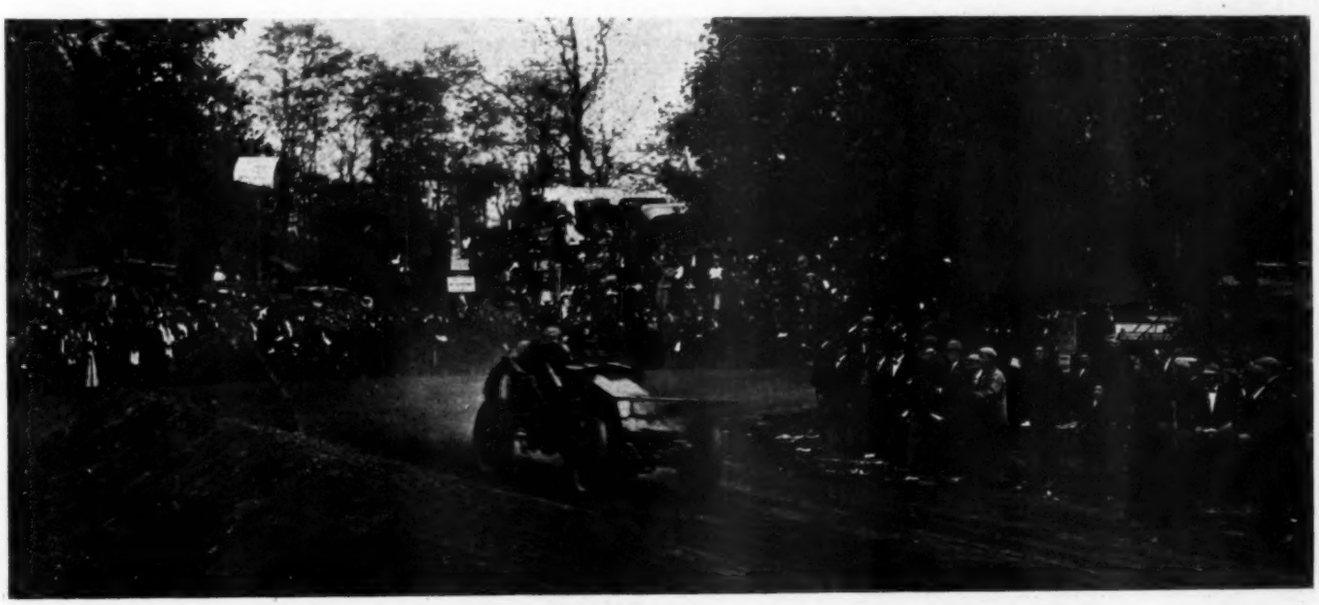
only change in the whole time. Haupt was now but 27 seconds ahead of Stricker, who led Lytle by 37 seconds. It was a race for fair. Robertson had gained on Lytle, but was losing to the Chadwick and Mr. Graves's car.

Sixth Lap (140.70 Miles).—Robertson now began to realize his danger and drove like a speed demon indeed. Covering the course in 20:30, he swept by Lytle and at the end of the lap was in second place, but with a margin of 1 min. 13 sec. separating him from the flying Chadwick. Lytle had spurted down to 22 minutes flat and Stricker had fallen over three minutes behind the flying trio of leaders. This quartette was opening a wide field on the pursuing field.

Seventh Lap (164.22 Miles).—At 9:07 word came that Haupt had stopped near Bethpage and that Lytle had passed him. At this time the Chadwick was not only leading in actual time, but heading the pocession as well. He had some trouble with a loose chain, but it was a balky magneto that was his undoing. From here on, though he continued in the race, he was no longer a factor. He had put up a brilliant performance and demonstrated that the Chadwick is a car to be reckoned with in the future in any company. The race had now become a duel between Robertson and Lytle. With the falling back of Haupt, the Locomobile had once more assumed the leadership. Putting up another lap in 20:36 as against Lytle's 22:05, he led the game Isotta that needed nothing but a wee bit of more power and speed by 2:09 at the end of the seventh round. With Haupt out, Stricker again got in the leading trio with Mr. Graves's car.

Eighth Lap (187.08 Miles).—The contest had now narrowed down to a match race between the Locomobile and the Isotta, though Stricker was some five minutes behind with the Mercedes, his only chance lying in an accident or more than a normal tire repair or fuel filling stop. Calamity came to Salzman in this round. The Thomas had been running smoothly and well scoring its laps in from 22:31 to 24:13. At the end of the preceding lap, which it finished in fourth place, it was tied up in front of the grandstand with an ill-fitting rim. It took Salzman fully 20 minutes to right it and this delay caused him a drop from fourth to sixth place. In this round Robertson pulled away a bit from Lytle and led him 3 min. 29 sec.

Ninth Lap (211.44 Miles).—Robertson slowed down a trifle



When Strang Finally Got His Renault Into Action, It Accomplished Some Remarkably Fast Laps Before Its Finish.

in this lap to a 22:22 gait, and Lytle kept the Isotta at its limit, scoring 21:48. The Italian car showed the same even pace it has displayed in all its races. Up to this point its fastest lap had been done in 21:33 and its slowest in 23:42, a variation of but 2 min. 9 sec., fuel replenishment stops included.

"I just drove the Isotta at its best all the way," said Lytle, "and that was all I could do. The car could go no faster and its fastest was not fast enough to beat the big Locomobile."

Tenth Lap (234.60 Miles).—Once more Robertson quickened the pace of the Locomobile and pulled away a bit further from the Isotta, their respective circuits footing up 20:55 and 22:10. It was in this round that Graves lost his grip on third place with Mr. Graves's Mercedes. Stricker stopped at the Locust Grove Station to look after a leak that had developed in his radiator. When he lifted the hood he saw that the fan had come loose and run amuck, ripping a hole in the radiator, and that he was out of the race. This let Mr. Vanderbilt's Mercedes into third place, while the Salzman Thomas moved up into fourth position, closely pursued by Florida in the Locomobile.

The Finish (258.06 Miles).—Entering the last lap Robertson began his run over the homestretch with a margin of 4 min. 10 sec. Lytle, however, it must be remembered, had started ten minutes before Robertson and so was first to start the last round. Though the Locomobile had the race well and safely in hand, barring accidents, there was always the possibility of a stop for one cause or another. Robertson had been on his last circut some ten minutes when the announcement was bellowed by Peter Prunty through the megaphone that the Locomobile was off the road near Locust Grove. The excitement had hitherto been great. It became a tumult now. It raged for two minutes and then came the message that the favorite was on the road again and on his way. A great cheer went up. It seems that a skid had sent a tire to the bad. It took him 2 min. 10 sec. to unlimber a fresh tire and make the replacement.

Then, Lytle finished his run. All those at the finish, whose eyes were not glued to their watches, gazed eagerly up the stretch. Seven minutes passed and no Robertson. Eight minutes came and with it the Locomobile over the top of the hill, half a mile away. In less than 30 seconds he had flashed by the stand.

"Time! Time! Time!" yelled the crowd. It came quickly for once: "240 minutes 48 1-5 seconds." Robertson had won by 1 min. 48 1-5 sec. Thousands cheered themselves hoarse at America's first international road race victory. Then came the rush of the crowd that caused the ending of the race.

FOURTH RACE FOR THE VANDERBILT CUP, October 24, 1908—DISTANCE, 258.06 MILES; CIRCUIT, 23.46 MILES.

No.	Car	H.P.	Driver	Mechanic	1	2	3	4	5	6	7	8	9	10	11	Total
16	LOCOMOBILE	120	Robertson	Hethridge	20:54	43:07 22:13	1:03:24 20:17	1:29:14 25:50	1:51:37 22:23	2:12:07 21:30	2:32:43 20:36	2:53:19 20:26	3:15:41 22:22	3:36:36 20:55	4:00:48½ 24:12½	4:00:48½
6	ISOTTA	60	Lytle	Fehr	21:52	43:26 21:34	1:05:16 21:50	1:27:19 22:03	1:50:47 23:28	2:12:47 22:00	2:34:52 22:05	2:56:48 21:56	3:18:36 21:52	3:40:46 22:10	4:02:36‡ 21:50‡	4:02:36‡
1	LOCOMOBILE	120	Florida	Hall	23:10	45:23 22:13	1:07:36 22:13	1:33:34 26:08	1:55:22 21:38	2:23:39 28:17	2:45:15 21:36	3:11:14 25:59	3:47:23 36:09	4:09:07 21:44	4:28:10 21:03	*4:28:10
5	MERCEDES	120	Luttgen	Pfeiffer	23:32	49:16 25:44	1:12:10 22:54	1:34:34 22:24	1:56:50 22:16	2:19:15 22:25	2:46:42 27:27	3:08:49 22:07	3:36:14 27:25	4:03:30 27:16	4:30:35 27:05	‡4:30:35
12	THOMAS	115	Salzman	Clanchow	22:04	46:17 24:13	1:08:54 22:37	1:31:25 22:31	1:53:58 22:33	2:16:47 22:49	2:39:51 22:56	3:21:41 41:50	3:45:34 23:53	4:08:11 22:37	Running when race stopped.	
2	KNOX	40	Dennison	Crane	24:33	56:39 32:06	1:21:42 25:03	1:47:19 25:37	2:21:36 34:17	2:47:20 25:44	3:15:18 27:58	3:45:56 30:38	4:13:09 27:13	Running when race stopped.		
3	MERCEDES	120	Stricker	Conners	22:25	43:22 20:47	1:04:49 22:57	1:26:10 22:13	1:50:20 21:18	2:15:04 24:44	2:39:48 24:44	3:01:15 21:27	3:30:57 29:42	Caught fire and retired.		
20	KNOX	50	Bourque	Lynch	27:15	52:06 24:51	1:17:32 25:26	1:43:06 25:24	2:15:41 32:35	2:43:47 28:06	3:15:00 31:13	3:42:20 27:20	Running when race stopped.			
8	THOMAS	80	Seymour	Pepperday	31:43	1:03:43 32:00	1:35:05 31:22	2:12:56 37:51	2:40:29 27:33	3:09:16 28:47	3:35:23 26:07	4:03:01 27:38	Running when race stopped.			
4	CHADWICK	90	Haupt	Lindquist	21:53	43:22 21:29	1:04:49 21:27	1:26:10 21:21	1:47:46 21:36	2:11:54 24:08	3:08:00 56:06	4:04:15 56:15	Running when race stopped.			
18	MERCEDES	120	Keene	Ehrweiler	53:25	1:16:17 23:52	1:38:35 22:18	2:00:45 22:10	Caught fire.							
7	MATHESON	60	Ryall	Hook	26:13	1:05:59 39:46	1:37:45 32:57	Caught fire.								
17	RENAULT	115	Strang	Addison	59:49	1:22:47 22:58	1:46:45 23:58	Broke clutch.								
11	ACME	60	Patschke	Dearborn	23:23	48:06 24:43	Withdrawn.									
9	HOTCHKISS	120	Kilpatrick	Kiehn	22:43	1:08:13 45:30	Broke clutch.									
15	MATHESON	85	Chevrolet	Nelson	22:09	Cracked cylinder.										
19	THOMAS	115	Gill	Gilbert	26:45	Gear trouble.										
10	BRASIER	96	Pouget	Stone	Did not start.											
14	B. L. M.	85	Williams		Did not start.											

*Finished unofficially; time estimated, owing to accident near finish line; allowance, three minutes.
‡Unofficial time, race having been declared ended.

HOW THE LEAD SHIFTED DURING THE RACE

No.	Car	1st Lap	2d Lap	3d Lap	4th Lap	5th Lap	6th Lap	7th Lap	8th Lap	9th Lap	10th Lap	11th Lap
16	LOCOMOBILE	1	1	1	4	4	2	1	1	1	1	1
6	ISOTTA	2	3	3	2	3	3	2	2	2	2	2
1	LOCOMOBILE	8	5	5	6	6	7	5	5	6	5	3
5	MERCEDES	10	8	7	7	7	6	6	4	4	3	4
12	THOMAS	4	6	6	5	5	5	4	6	5	4	
3	MERCEDES	6	4	4	3	2	4	3	3	3		
2	KNOX	11	10	9	9	9	9	9	8	7		
20	KNOX	14	9	8	8	8	8	8	7			
8	THOMAS	15	11	10	11	10	10	10	9			
4	CHADWICK	3	2	2	1	1	1	7	10			
18	MERCEDES	16	14	12	10							
7	MATHESON	12	12	11								
17	RENAULT	17	15	13								
11	ACME	9	7									
9	HOTCHKISS	7	13									
15	MATHESON	5										
19	THOMAS	13										

THE BATTLE FOR THE LEAD

Lap	Miles	First	Time	Second	Time	Third	Time
1	23.46	LOCO. No. 16.	20:54	ISOTTA	21:52	CHADWICK.	21:53
2	46.02	LOCO. No. 16.	43:07	CHADWICK.	43:22	ISOTTA	43:26
3	70.38	LOCO. No. 16.	63:24	CHADWICK.	64:49	ISOTTA	65:15
4	93.84	CHADWICK.	86:10	ISOTTA	87:19	MERC. No. 3.	88:42
5	117.30	CHADWICK.	107:46	MERC. No. 3.	110:20	ISOTTA	110:47
6	140.76	CHADWICK.	131:54	LOCO. No. 16.	132:07	ISOTTA	132:47
7	164.22	LOCO. No. 16.	152:43	ISOTTA	154:52	MERC. No. 3.	159:48
8	187.88	LOCO. No. 16.	173:19	ISOTTA	176:48	MERC. No. 3.	181:15
9	211.44	LOCO. No. 16.	195:41	ISOTTA	198:36	MERC. No. 3.	210:57
10	234.60	LOCO. No. 16.	216:36	ISOTTA	220:46	MERC. No. 5.	243:30
11	258.06	LOCO. No. 16.	240:48½	ISOTTA	242:36‡	*LOCO. No. 1.	268:10

*Unofficial timing.

FASTEST LAPS OF THE RACE

Car	Driver	Lap	Time	M.P.H.
LOCOMOBILE	Robertson	3d	20:17	69.4
LOCOMOBILE	Robertson	8th	20:26	68.9
LOCOMOBILE	Robertson	7th	20:36	68.4
LOCOMOBILE	Robertson	1st	20:54	67.3
LOCOMOBILE	Robertson	10th	20:55	67.2
MERCEDES	Stricker	2d	20:57	67.1
MERCEDES	Stricker	5th	21:18	66.1
CHADWICK	Haupt	4th	21:21	65.8
CHADWICK	Haupt	3d	21:27	65.6
MERCEDES	Stricker	8th	21:27	65.6

REGULARITY OF RUNNING

Car	Driver	Fastest	Slowest	Variation
ISOTTA	Lytle	21:34	23:28	1.54
MERCEDES	Luttgen	22:07	27:27	5.20
LOCOMOBILE	Robertson	20:17	25:50	5.23
KNOX	Bourque	24:51	31:13	6.22
MERCEDES	Stricker	20:57	29:42	8.45
KNOX	Dennison	24:33	34:17	9.44

AVERAGE SPEED OF LEADERS

Car	Driver	Miles	Time	M.P.H.
LOCOMOBILE	Robertson	258.06	4:00:48 1-5	64.3
ISOTTA	Lytle	258.06	4:02:36 2-5	63.8
LOCOMOBILE	Florida	258.06	4:28:10	57.14
MERCEDES	Luttgen	258.06	4:30:35	57.8

Viewed from a Technical Standpoint

THE triumph of American automobile engineering and manufacturing is well evidenced by the fact that at the time the race was officially called off, seven of the eleven American cars were running in good shape, whereas but two of the six foreign machines were running. America had 63.6 of its cars working; Europe had 33.3 of its racing creations still active in the conflict. Of the eleven cars under American colors five can be designated old machines, their début in road racing dating back to October, 1906, when they contested either in the eliminating or final Cup trials. Robertson's winning Locomobile, as well as the other driven by Florida, were built for the 1906 event, but have been renovated since only to the extent of installing a selective type of gearset to take the place of the progressive type that the Locomobile company was fitting in its machines a couple of years ago.

The two Thomas cars were the same seen two years ago, but altered in appearance by the use of cylindrical transverse gasoline tanks in place of the type previously used in which the seat was incorporated with tank. There were other minor changes.

Ryall's Matheson also was a two-year-old save in that not a few improvements had been added which were not of sufficient import to eradicate the characteristic lines it originally carried. Of these five, three were running in good shape at the finish, one being the winner and the other absolutely certain of third place had the officials succeeded in keeping the course clear and allowed at least five cars to finish. The performance of these five cars is such as to warrant the inference that two years ago America had solved to a large extent, in one or two factories at least, the problem of building enduring racing cars even if at that period our drivers were not the equal in experience of those bred abroad.

The six newly-constructed American machines gave a good account of themselves and four were running with the utmost regularity at the finish, the Chadwick six, the two Knox machines, and the Grand Prix Thomas being the quartette. At the end of the sixth lap the Chadwick was leading the field by a margin of 13 seconds and running with great ease and regularity; but lap seven was its Waterloo in which a couple of magnetos went out of commission and necessitated running eight miles to the repair camp on three cylinders. In one magneto the distributor pin sheared off, the other short-circuited in the armature. It took 56 minutes and 6 seconds to complete the lap and by that time its chance of winning was eliminated.

The Grand Prix Thomas No. 8 driven by Seymour did not show fast speed at any time, but evidenced regularity in the eight laps it completed.

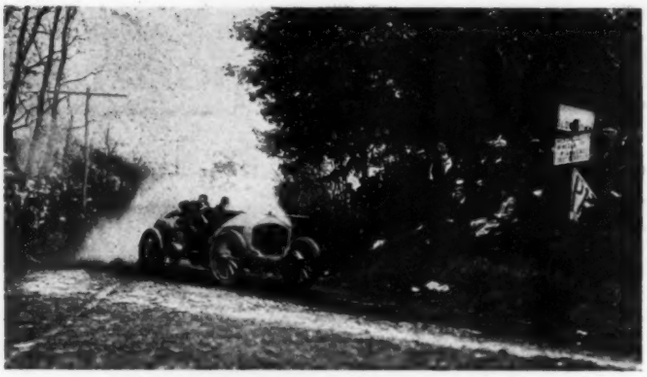
The other two cars to keep in the running were the two Knox machines, piloted respectively by Denison and Bourque; Denison having finished nine laps and Bourque eight and reaching the grand stand unofficially on the ninth. Bourque's machine holds the distinction of being the lowest-powered racer on the parkway, having a horsepower of 38 according to A. L. A. M. formula. In spite of this lack of power it negotiated laps in 24, 25, 37, 28, 31, and 32 minutes, a performance of commendable regularity. Denison's car is a higher-powered and faster machine and got a mark of 22:01 in the second lap, which proved to be its fastest. Both of these cars are alike in motor design, but differ in that the Denison machine is chain driven and Bourque's shaft. Both are characterized by motors having intake and exhaust valves carried side by side in the cylinder heads and with overhead rocker arm actuation.

It is regrettable that two of the new American cup contestants should have been forced to withdraw early in the race, the Acme six in the third lap and the Matheson in the second lap. The Acme started off on the first two rounds with a regularity that recalled its consistency at Savannah last Spring and critics started to look for a repetition of that performance. A long wait for the completion of lap three frosted the expectations and soon a special telephone message to the headquarters brought the information that one of the timing gears on the engine had broken and had incidentally wrecked the gear on the other camshaft. This necessitated immediate withdrawal. From a representative of the company it was learned that both of the camshaft gears are made of manganese bronze, a metal highly capable of withstanding the heaviest service, but it seems that the accident was simply one more case of racing luck—a misfortune which might have been avoided by a longer practice period. This car being the other six-cylinder contestant, much interest centered in its performance, and many were watching the working of the "sixes." But it shared misfortune with the Chadwick, though much more seriously, and the American public will have to wait for another performance before the "battle of the sixes" will be in more tangible form.

From a standpoint of tire wear, it is interesting to note that the Chadwick "six" in the eight laps it completed and in the unofficial ninth had not to make a single tire replacement, and a cursory examination of the tires as the car stood in front of the grand stand after the race was called off failed to discover any traces of extreme wear that would tend to indicate that a change would have been imperative before the end of the race had the machine been privileged to finish.

Immediately after the Cup race the officials of the Chadwick Engineering Works arranged for a public inspection of the car. For this purpose, the motor was dismantled in order that the dimensions and finish of the cylinders, as well as its other parts, could be examined. Through an unfortunate error it was stated in the table printed in the issue of THE AUTOMOBILE of October 22, that the motor was rated at 90 horsepower. By the A. L. A. M. official rating, its cylinder dimensions of 5-inch bore by 6-inch stroke show it to be but 60-horsepower, in view of which its performance during the four laps of the race prior to its delays through magneto trouble is all the more creditable. The makers state they will guarantee deliveries of duplicates of the Vanderbilt car, and will further guarantee them to be capable of the same endurance and speed.

The Chevrolet Matheson encountered hard luck on the second



Six-cylinder Acme Making a Spectacular Turn.

lap when the cracking of a cylinder worked its speedy elimination, although the car did not suffer any other troubles. This car is a four-cylinder machine in which are incorporated many of the principles of the 1909 cars which, it is said, will differ materially from the present machines. The car is a shaft-driven type and made a most favorable impression by its quick and easy getaway. This car uses a left side exhaust instead of the right used on the old Matheson, and the value of such in a race is considerable in that there is much less danger of the smoke getting in the driver's face. In Ryall's Matheson the exhaust is taken out through the bonnet particularly high on the right side and over the carbureter, and it was doubtless owing to this scheme that the car reached the grand stand on the last lap with flames shooting from the mud apron. The initial trouble, and undoubted cause of the fire, came when the driver hit a cement bridge too near the right side and at too high a pace, the result being a badly sprung rear axle at the right and the right rear wheel splayed at the bottom. This quick jerk, due to hitting the bridge, shot the gasoline upwards out of the carbureter, the vapor from which was quickly ignited because of the proximity of the hot exhaust pipes. To accentuate the danger was the fact that on this car the carbureter was slightly higher than ordinary, bringing it still closer to the exhaust. The fire had nothing to do, however, with the withdrawing of the car, as this was directly owing to a short-circuiting of the armature winding of the magneto.

Of the seventeen cars that started, thirteen were chain driven machines and four shaft-driven, the latter class including Bourque's Knox, Strang's Renault, Chevrolet's Matheson, and the Hotchkiss. It is rather interesting to note that only one of these was running at the finish, the cause of their elimination, however, not being due to shaft drive. Of the chain-driven cars the Chadwick was the only one to make use of chain casings.

The five examples of low-tension make-and-break ignition were the two Locomobiles, and the three Mercedes cars and the Matheson. All others used jump spark with magnetos.

In motor design plenty of variation appeared. The Acme

Replenishing at Grandstand, Car Being the Isotta.

Knox and Grand Prix Thomas serving as examples of individually cast cylinders, while practically all of the other cars had cylinders in twin castings. In the Locomobiles the intake valves are in the cylinder heads and operated by rocker arm, and in the two Vanderbilt Thomases the intakes are directly above the exhaust in valve chambers on the left side, and are opened through rocker valve action. This is sufficient to show that the tendency is very strong in racing cars to locate one set of valves in the cylinder head and in some cases to put both sets in this position if room permits.

The additional lubricating facilities for a racing car will always be an interesting factor, equally interesting as is the continuous pumping of oil to the crankcase by the mechanics of many of the cars. The majority of them use large cylindrical oil tanks, some of which ahe carried between the gasoline tank in the seat, others on the dash—like the Hotchkiss, and one or two on the floor board in front of the seat, as used on one of the Mercedes. The large reciprocating oil pump in the footboard is with a majority of the racing cars an absolute necessity, and is an indication of the large quantities of oil necessary.

Many of the contestants showed inexperience by the small filling caps for the gasoline tanks as well as the oil tanks, and to these may be added the radiator caps. Undoubtedly the best example of large filling caps was Lytle's Isotta. When he stopped to take on supplies in front of the grand stand a funnel was handed of sufficient size, so that three 5-gallon gasoline cans could be dumped on end into it at once, while the mechanic held a fourth 5-gallon aloft and simultaneously emptied its contents into the funnel. By having each of the 5-gallon cans with specially large spouts, the work was done all the quicker. The oil arrangements for this car were such that it was but a matter of a few seconds to empty a 5-gallon can of oil into the oil tank. Robertson had mediumly good facilities, but lost time filling the radiator from a common garden hose at the starting of the second lap. Both of the Knox cars could have saved time by the use of long-leverage lifting jacks to raise the axle when making tire changes instead of using the common jack that the ordinary tourist carries in his kit.

Wheelbase Not, as Heretofore, a Factor.

The problem of wheelbase was not a determining factor in this year's race, as it was on the two occasions when the Darracq cars, piloted by Hemery and Wagner, carried off the trophy. Both of the Locombiles measured 110 inches from axle to axle, the Isotta is 118, and had the distinction of being the longest wheelbase machine in the contest. All three Mercedes measure 107 inches; Haupt's Chadwick, 112 inches; the Knoxes, 102 and 106 inches, respectively; and the Thomases, 104 and 112 inches. The banking of the turns is a factor which eliminates the wheelbase question to a considerable extent.

A commendable precaution in the form of a wire screen in front of the radiator was noticed on the Isotta and No. 3 Mercedes, the purport of these being to prevent injury to the radiator by stones thrown by other cars.

Because of the weight limit allowed in the contest, the wholesale drilling of frame parts and axles to reduce weight was not noticeable, except in one or two cases where particularly heavy cars had to reduce a good few hundred pounds. No. 4 Chadwick had the rear axle drilled throughout its entire length, but, in spite of this, had a good safety factor by reason of the original axle size. This car used a peculiar type of front semi-elliptic spring, in which the leaf which bolted to the spring hanger at the front end extended but half the length of the spring and bolted to a projection on the top of the spring shackle, giving an extra leaf in the front half of the spring, and one double in thickness for the remaining leaves. In conjunction with this shock absorbers were used only in front. The majority of makers used shock absorbers in front and rear, and it was apparent that the Hartfords had by far the biggest following; the Renault car, however, being fitted with absorbers built at the home factory.

Mechanical Misfortunes of Some Contestants

THAT the race is not always to the swift is quite as true of automobile racing as it is of other things, and nothing brought this out more strikingly than the mishaps which served to place some otherwise dangerous competitors *hors de combat* long before things had settled down to a point where a winner could be picked with anything like certainty. Contrary to precedents set by former occasions of the kind, when the great bulk of the contestants' misfortunes have been of a nature so trivial as to make them far more aggravating causes of defeat on that account, all of the drivers' mishaps last Saturday were not small; or, if petty in their origin, they led to things sufficiently serious to make it impossible to proceed.

Probably in few events of classic importance that have been run since the automobile attained to a degree of development where its design was no longer a matter of guesswork, has the cooling water proved such a prolific source of misfortune. Right from Robertson, whose Locomobile lost two minutes on the first lap on this account, down to Stricker and Keene of the Mercedes trio, who were placed hopelessly out of the running at an early hour, the range extended, and there were not a few others who found the necessity of replenishing the radiator an imperative duty before they had gone very long. Well-meant efforts to guard against defeat from any cause whatever, coupled with a little nervousness that was natural under the circumstances, was responsible for this slight trouble on the part of Robertson's Locomobile. The latter is equipped with a high-compression motor of large size, fitted with low-tension ignition and with no compression relief or other means for facilitating its starting. No little strength is required to turn it over, and for fear that one of those little things that cannot be guarded against on the best regulated of motors might serve to delay his start and lose time at a crucial moment, Robertson ran the motor idle for quite some time before Florida in the No. 1 Locomobile was called to the line. The result was that the motor ran pretty warm and it had evaporated no inconsiderable part of its normal allottment of cooling water by the time it got away. Robertson's time for the first lap shows that fear of overheating did not delay him any, but many of the Locomobile supporters were in an agony of suspense, thinking that he might find it necessary to stop at some inaccessible place on the course to replenish the radiator. Fortunately, this did not happen, and the most serious result was the loss of a minute or two that had to be deducted from the following lap, due to the necessity of stopping at the stand to fill the radiator, but the manner in which the car was brought to its pit and the squirting hose made to deliver its output into the steaming radiator brought a cheer of admiration from the entire crowd. Quite in contrast with this, were the performances of those mechanics who leisurely removed the radiator cap and slowly poured the contents of a spout can into it.

But some of the drivers, whose misfortunes consisted of lack of sufficient cooling water, were not so fortunate. Seymour in the No. 8 Thomas Grand Prix car made no less than three stops at the Locust Grove repair station for the purpose of refilling the radiator, though like Robertson, his chief loss was in the time consumed. In the case of some of the others, it was a far more serious matter. In fact, two of the Mercedes entries, those handled by Foxhall Keene and Stricker, were retired on this account. When he returned to the stand on foot, in exactly the same manner as characterized his appearance during the second half of the 1906 Vanderbilt, and attired in the same clothes, Mr. Keene explained to Mr. Vanderbilt that a leaky radiator was the primary cause of his troubles, though he added that more real trouble had been condensed into an hour's running that he had ever been put to before in his entire automobiling experience. The gradual loss of the water caused the motor to overheat to a point where it was no longer safe to run it further, and everything on the motor was brought to such a high temperature that the oil-soaked ignition cables caught fire, effectively putting a quietus on the car's chances.

Stricker's case was even more serious. One of the fan blades came loose from its hub and, flying against the inner face of the honeycomb radiator, made several gashes in it, through which all the water escaped, so that when its condition was discovered, the motor could not be run until allowed to cool. The use of any water obtainable would have meant cracked cylinders, so that after the temperature had been lowered considerably by waiting, lubricating oil was resorted to in the attempt to locate the radiator leaks, but things were still so hot that the oil promptly caught

Hands Across the Sea—Locomobile and Mercedes.

But Robertson's Smile Is Happier Than That of Lytle.

fire, thus adding another to the list of competitors whose chances were ruined from this cause.

As a matter of fact, this most spectacular cause of a car's retirement was far more common than has ever been the case in any former event of the kind. In addition to the troubles of Keene's and Stricker's cars, which took place on the backstretch, the latter, near the Locust Grove repair station, Ryall's No. 7 Matheson suffered the same disaster, though from a different cause, and was driven several miles in a sheet of flame, until the grandstand was reached, where the fire was speedily put out. There it was learned that the fire originated from a gasoline leak. This mishap was further complicated by magneto trouble and ended Ryall's chances, although every effort was made to get the car in shape again.

Just what had been responsible for the sudden and inexplicable elision of the Acme after having made two good laps, remained a mystery throughout the race. It had disappeared into its garage at Central Park and did not appear again after the second lap, but it was subsequently learned that the shearing of the pin holding the main timing gear on the crankshaft had put it hopelessly out of the running. Another of the long list of miscellaneous troubles that served to cut down the number of cars still running at the finish was the cracking of a cylinder on Chevrolet's Matheson, which was the first to be permanently retired. Doubtless the most disappointing case was that of the Brasier which broke its steering gear on the way to the start. Gill's Thomas provided the only case of gear trouble, while Salzman's No. 12 Thomas, which was third up to the seventh lap, had the misfortune to shear off four of the hub bolts holding the driving sprocket, replacing which cost fully 20 minutes and ended his fight for honors.

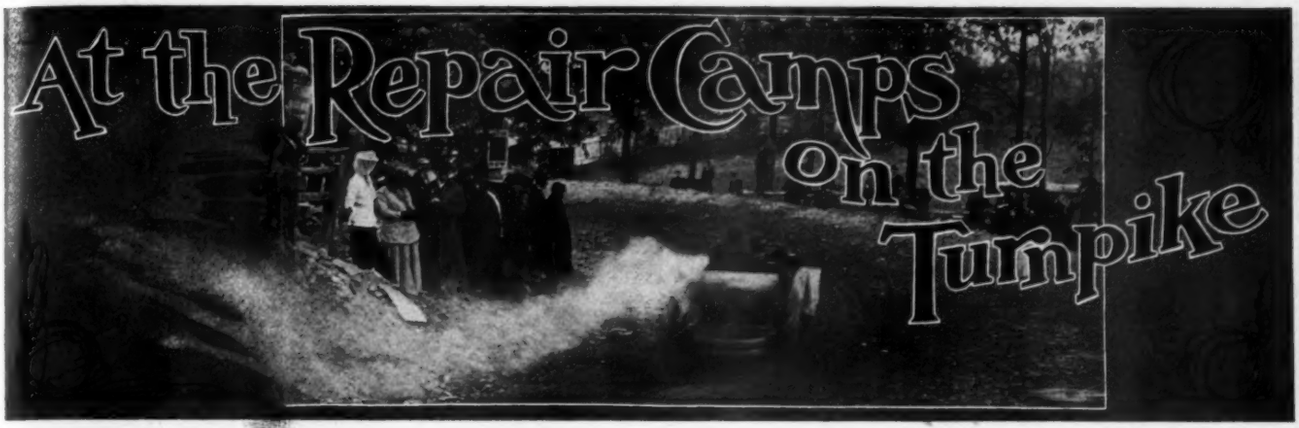
Of the things most to be dreaded by the racing driver, the petty troubles arising from ignition defections are probably feared more than any other, owing to the great loss of time they usually occasion to right them. They are generally trivial in themselves, but remedying them often means the waste of such an amount of precious time that ignition trouble is naturally the *bete noir* of every handler of the wheel.

It seemed particularly unfortunate that the Chadwick's highly creditable performance, which made Haupt a most likely winner right up to the end of the sixth lap, should have been spoiled on this account, as the consistency of the car's running and the great smoothness with which it maintained its lead were remarkable and formed the subject of universal comment at the stand. The tone of the big six-cylinder engine was scarcely a purr compared to the roar of the others, though it was reeling off the miles much faster than the majority of them, and the manner in which it was performing showed that a month's work could not have put a motor in more perfect running condition, as indeed its subsequent examination showed it to be, thus indicating that its defection was entirely due to the failure of the magneto. The Chadwick was the only car in the race that was equipped with two magnetos and independent wiring, but as ill-luck would have it, whatever was responsible for the defection of the one in use at the time, also appeared to affect the other, and even a third, which was taken as a replacement at the Locust Grove control, did not remedy matters entirely. Apart from this trouble, which caused Haupt to consume 50 minutes on the seventh lap, instead of his former average of about 21:25, the only stop was caused by a loose driving chain, which inspection showed did not require much attention and which ran the rest of the race as it was.

Strang's Renault was the first unfortunate to suffer from ignition trouble, due principally to the fact that the magneto fitted had only been put in place the night before, so that little or no time had been afforded in which to tune the car up with it on. Locating and remedying the trouble, which lay in the interruptor, cost Strang half an hour, and his chances were finally ended a few rounds later by the burning out of the clutch leather. Clutch troubles also ended the career of the big Hotchkiss early.

From an electrical point of view, the race was largely a battle of magnetos, as the contesting cars were fitted with the Bosch and Eisemann high tension magnetos in about the same proportions, the exceptions being the two Locomobiles, with their special low-tension magnetos, and the two Knox entries, which carried Splitdorf magnetos and a Connecticut four-unit dash coil and dry cells for starting.

Illustrates How the Crowd Swarmed on the Course After the Winning Locomobile Finished—Luttgen Is Worrying Through.



NOTWITHSTANDING the fact that the repair camp located at Locust Grove, about half way between Jericho and Woodbury, was fully equipped to meet almost any emergency in the nature of damage, and although each car had provided a separate stall manned by experts from the factories and supplied with every imaginable tool and extra part, there was but little call for any of these. The four racers to pass on the final round managed to dispense with the services of this available control entirely. The large crowd which had congregated at this point was evidently of the opinion that there would be "something doing" in the line of record breaking repairs and replacements, and was only too eager to surround every car as it pulled up to its stand for gasoline, water, or oil.

The size and inquisitiveness of the crowd were a continual source of annoyance to the drivers who were forced to stop, when every second was precious, as was the case with two of the leading cars which met with minor accidents. There was small cause for wonder that several of the drivers became angry and made the air almost as blue with their vituperations as did the burning oil from the smoking motors.

Locust Grove is located near Syosset on the north side of the straight two-mile stretch of road between Collier's curve and Jackson's Corners, and as this is slightly down grade, it was along here that some of the greatest bursts of speed of the whole race were attained. The entrance to the repair stalls was about six inches deep in sand and dust, and one of the most spectacular features of the race was the sight of one of these powerful cars when it suddenly swerved off the main road and came ploughing through this soft road-bed, throwing the loose dirt in all directions. This served to attract the attention of the crowd to the unfortunate car, and by the time the tank cap could be unscrewed or the hood unstrapped, a mob twenty deep had surrounded the racer—there to remain until its attention could be attracted by the arrival at the control of another of the contestants. Of course many of the individuals endeavored to assist the drivers by handing them the necessary tools or parts, but in reality these little acts were more of a hindrance than a help, as it was one of the rules of the contest that the various supplies and accessories should be laid on the counter of the stall before which the car stopped and from there taken to the machine by either the driver or his mechanician.

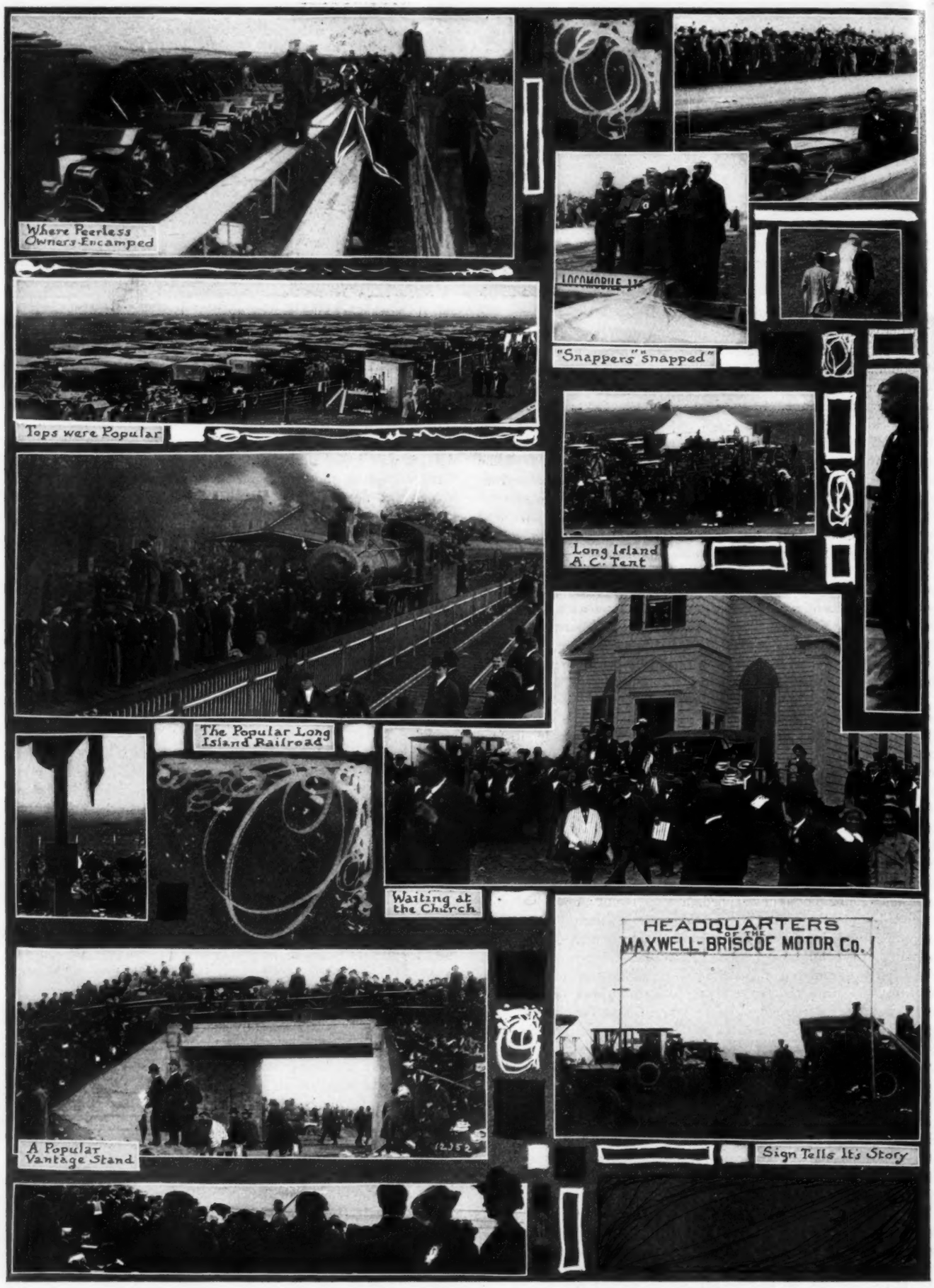
While there was a total of eleven stops made for repairs, replacements, or replenishments by six different cars, but two of these halts had any direct bearing on the result of the race. The first car to pull up at the enclosure was the No. 7 Matheson on its second round. This car had lost the top nut of the right-hand steering knuckle, and although the car could be operated, high speeding with the steering mechanism in this condition was dangerous. An extra nut was soon found among the bag of spare parts carried on the car, and after a few turns with a monkey wrench, the car was again on its way, having spent about six minutes in repairing the damage. In the meantime, however, the Knox car No. 20 had passed on its second round and the Locomobile No. 1, the Chadwick No. 4, the Mercedes No. 3, and the Isotta No. 6 had all whizzed by, each on its third round.

While this stop of six minutes did not put the Matheson No. 7 hopelessly out of the race, its halt again on the fifth round was probably indirectly the cause of its burning a few minutes later farther down the course. The motor had been running badly on this fifth round, and when the stop was made for the second time, it was found that one of the needle valves had been lost, thereby causing the carbureter to form an imperfect mixture. While this needle valve was being replaced, opportunity was taken to replenish the gasoline, water, and oil tanks. The gasoline was poured in from five-gallon cubical cans which had a part of the cover torn off. This did not form a very good spout, and the result was that a large part of each can was spilled over the entire rear part of the car, and it appeared to the spectators as though even the seat was saturated with gasoline. Many who saw this shower bath of gasoline believe that this method of filling the tank was the direct cause of the fire which soon after burst out from that part of the car. Be that as it may, this contestant was effectually retired from the race soon after, but the speed with which the two replacements in question had been made was the cause of many expressions of admiration from the crowd.

On his first round, Joe Seymour, who was driving the Thomas No. 8, passed slowly and called out to ask where the supply station was located. Much to the surprise of everyone, he did not stop then, but during his six subsequent rounds he halted three times—once for a new front tire and water, and twice for more water. In the meantime, it was expected with each round that Louis Strang in his unfortunate Renault would stop for repairs, but he managed to ignore the backstretch repair station until his car was finally forced to withdraw from the race.

The two little Knox cars were the center of admiring groups when they each stopped for minor adjustments—notwithstanding the fact that the force of their side exhausts was almost sufficient to blow a man over. No. 2 stopped on the ninth round to strap on a new extra tire, while No. 20 stopped on the fifth round to fill the crankcase with fresh oil. This latter car also stopped on the seventh round for a few seconds to replace a spark plug. When No. 20 left the enclosure after its first stop, it started out neck-and-neck with the Matheson No. 7, and the crowd was treated to the sight of an exciting brush down the road. This private race did not last long, however, as it was but a few minutes later that the Matheson caught fire.

The high hopes of the Chadwick adherents for their car were blasted on the seventh round by magneto troubles which developed. This car had started the race in fourth position and at the end of the third round had climbed to first place. It held this position for three rounds and was looked upon as a probable winner on account of its consistent running and the high speed of which it proved itself capable, when this trouble with the ignition was encountered. The fault was found to lie in the magneto, but as two sets of ignition apparatus were carried, the


Where Peerless Owners Encamped
"Snappers" snapped
Tops were Popular
Long Island A. C. Tent
The Popular Long Island Railroad
Waiting at the Church
HEADQUARTERS OF THE MAXWELL-BRISCOE MOTOR Co.
A Popular Vantage Stand
Sign Tells Its Story

trouble was thought to be remedied easily. The second magneto, however, also failed to work properly, and the car was forced to make a stop at the repair station. Here an entirely new magneto was attached to the motor, wired up, and protected from the mud and oil by a rubber cover. At the same time that this was being done, the tanks were replenished with gasoline, water, and oil, and yet the entire delay did not occupy more than five minutes. This stop, however, together with the delay on the road, destroyed all hopes of first place for the Chadwick, and thereafter it was forced to content itself with seventh and eighth positions. This was one of the minor accidents which seriously affected the results of the race. This car stopped once again on the ninth round for the purpose of tightening a loose chain, but it soon proceeded on its way again without taking the time to make the adjustment.

The one other car which had its position seriously affected by an annoying delay was Robert Graves' Mercedes No. 3, driven by Emile Stricker. Although this was the same car which was badly damaged in practice the preceeding week when it overturned, its performance was one of the best of the morning, and the racer had been holding second and third positions steadily for ten laps. Stricker had noticed that the motor had become somewhat heated and he stopped at the repair station on his last lap for the purpose of refilling his water tank. The motor was found to be almost red-hot and the tank absolutely empty. On investigation, it was found that one of the fan blades had broken and in its rapid revolution, had cut several holes in the honeycomb radiator, thus allowing all of the water to leak out. It was feared that one of the cylinders might become cracked if cold water were poured into this excessively hot circulating system, and yet a liquid of some kind was needed to determine the exact location of the leaks in the radiator. The danger of a cracked cylinder was avoided by pouring thin oil instead of water into the radiator, but after a few minutes this produced an unexpected result. When the oil came in contact with the hot cylinder walls, it was gradually vaporized and soon burst into flame which came out of the leaks in the circulating system. This set fire to the gasoline, grease, and oil on the outside of the motor, and soon the engine was a mass of flames. The fear of an explosion had the effect of causing the crowd to scatter to a saft distance, and Stricker and his mechanician were consequently given the elbow room which they probably could not have obtained in any other way. The flames were soon extinguished with the aid of sand and a few pieces of burlap in which some tires had been wrapped, but, as may be supposed, this fire did not serve to cool the engine very much sooner, and these contestants were forced to sit idly by and watch the other cars pass on their way to the coveted finish line. Soon after the race was officially declared to be over, the unfortunate Mercedes had cooled sufficiently to allow the water tank to be filled, and it then joined the long line of homeward-bound spectators' cars and finished its eleventh lap at a much slower gait than had marked its progress for the ten preceeding rounds.

Although several of the racers suffered from tire trouble, but few of them had occasion to stop for accidents of this kind at the backstretch repair station. In fact, there were but two tire replacements made at this station, and one of these, that on the Mercedes No. 3, was not made until the car had practically been forced to retire from the race by reason of its hot motor. The other replacement was made on the extra Thomas entry, No. 8, but as Thomas honors were easily captured by No. 12, the tire trouble on the former car had no direct results on the effect of the race. The Knox No. 2 stopped once at the control for a new Fisk tire, but this was strapped on the rear with the other extra tires to be used in case of necessity and could scarcely be considered a tire replacement at the repair shop.

Many of the entrants displayed signals at this portion of the course in order that the drivers of their cars might be kept informed of their relative positions in the race. The Isotta No. 6, which ran a nip-and-tuck race with the winning Locomobile No. 16, had a large sign displayed at each round showing the difference in time between Lytle's and Robertson's running for that particular lap. Toward the last of the race, when it was a question of seconds as to which would prove the winner, the crowd was kept in a continual state of excitement by the figures on this board. These at no time showed Robertson to be more than three minutes in the lead, and when it was announced that he had encountered tire trouble on the last lap, after the Isotta had passed, much apprehension as to the outcome of the race was felt by his adherents. Robertson took every advantage of the straight course and down grade, however, and when he passed the control after having replaced his tires, it was apparent to everyone that his car was going much faster than any racer which had passed at any time during the contest.

While several of the cars were forced to retire on account of mechanical troubles, a remarkably large percentage of them were entirely free from difficulties and annoyances of this kind, and the preparations which had been made to cope with almost any kind of a breakdown were called into but little use, all of which speaks well for the constructors of the cars.

THE AUTOMOBILE CALENDAR

AMERICAN.

Shows and Meetings.

Dec. 31-Jan. 7.—New York City, Grand Central Palace, Ninth Annual Automobile Show, conducted by the American Motor Car Manufacturers' Association, with Exhibits by the Importers' Automobile Salon, Inc., Alfred Reeves, General Manager, 29 West 42d St.

Jan. 16-23.....—New York City, Madison Square Garden, Ninth Annual National Show of the Association of Licensed Automobile Manufacturers. M. L. Downs, Secretary, 7 West 42d St., New York City.

Feb. 6-13.....—Chicago Coliseum and First Regiment Armory, Eighth Annual National Exhibition, National Association of Automobile Manufacturers. S. A. Miles, Manager, 7 East 42d St., New York.

Feb. 15-20.....—St. Louis, Mo., Annual Show St. Louis Dealers and Manufacturing Association.

Mar. 6-13.....—Boston, Mechanics' Building, Seventh Annual Automobile Show, Boston Automobile Dealers. Chester I. Campbell, Manager, 5 Park Square.

Mar. 7-13.....—Buffalo, Second Annual Power Boat and Sportsman's Show, Convention Hall, Dal H. Lewis, manager, 760 Main Street, Buffalo, N. Y.

Races, Hill-Climbs, Etc.

Oct. 31.....—Philadelphia, Sixth Annual Run of Automobile Club of Philadelphia for the Brazier Cup.

Nov. 3.....—New York City, Fort George Hill Climb, New York Automobile Trade Association.

Nov. 5-7.....—Detroit, Three-Day Endurance Run, Detroit Automobile Dealers' Association.

Nov. 25.....—Savannah, Ga., International Light Car Race, Savannah A. C. and Automobile Club of America.

Nov. 26.....—Savannah, Ga., Grand Prize Race, Savannah Automobile Club and Automobile Club of America.

FOREIGN.

Shows.

Nov. 13-21.....—London, Olympia, Seventh International Motor Exhibition.

Nov. 28-Dec. 13.—Paris, Eleventh Annual Salon de l'Automobile, Grand Palais, Automobile Club of France (Pleasure Vehicles, etc.)

Dec. 20-28.....—London, Stanley Show, Agricultural Hall.

Dec. 22-29.....—Paris, Eleventh Annual Salon de l'Automobile. (Commercial Vehicles, etc.)

Jan. 16-25.....—Brussels, Show Organized by Belgian Chamber Syndicate, Palais du Cinquantenaire.

THERE was less tire trouble in the 1908 race than in any previous contest for the Vanderbilt Cup. It was a great day for the vindication of tires, to which in years gone by many failures to make a good showing have been laid by drivers. To the perfection of the tire equipment can undoubtedly be laid in large measure the generally good performance of the majority of cars that started, and also the tremendous speed of the leading machines. The rain that fell during the night preceding the eventful day made it necessary to change all of the tires on all of the racers at the pits in front of the grand stand, steel studded non-skid tires being substituted for the lighter and faster plain rubber tread shoes, and a pair of extra studded tires and rims being strapped on behind.

This occasioned a delay of half an hour in starting the race. Drivers also asserted that the use of the non-skid tires and the extra caution in driving that would have to be exercised on account of the slippery condition of the course would slow the running time from two to four minutes for each lap. Yet much of this disadvantage was made up in the general freedom from burst tires and from tires pulling off the rims. After the race started there were not more than half a dozen stops to change tires at the grandstand and hardly more than that number on the other parts of the course. Stoppages during the race were made in the great majority of cases to take on water and gasoline or because of some mechanical trouble.

Michelins and Diamonds Predominated in the Race.

The winning Locomobile, driven by Robertson, and the Isotta, driven by Lytle, which won second place, were fitted with Michelin tires. William K. Vanderbilt, Jr.'s, Mercedes, driven by Luttgen, which finished fourth, although not officially timed, also had Michelins, while the other Locomobile, driven by Florida, which finished third, was fitted with Diamond grip tires and demountable rims. The two Knox cars, which were still running when the race was called off, were fitted with Fisk tires. Matheson No. 7, driven by Ryall, and the Acme car, were equipped with Diamond non-skid tires. All the other machines not already mentioned were equipped with Michelins.

Robertson stopped at the grandstand on his fourth round and changed his two rear tires as a precautionary measure, fearing that they may have become strained in his terrifically fast third lap made in 20:17. In his last lap he skidded off the road on the "S" turn at Plainview and tore off the left rear tire, which had to be replaced before the car could be driven onto the course again. Two minutes and 10 seconds were lost at this point, cutting down his lead over Lytle in the Isotta from more than four minutes to less than two.

The remarkable showing made by the Isotta with its 60 horsepower as compared with the higher powered cars is to be attributed partly to the fact that it did not stop once for tire changes, so that its performance was very regular, the greatest variation in its eleven rounds being only 1 min. 54 sec. Mr. Vanderbilt's Mercedes changed one rear tire that blew out just in front of the grandstand. The Graves' Mercedes blew out a front tire that had to be replaced, and on the eleventh lap a stop was made on the back stretch to replace a front right tire. The Chadwick, which was leading throughout the first six laps, was reported to have stopped in the backstretch to adjust tires, but it was delayed principally by ignition troubles during that and the subsequent lap, which it completed before the race was officially declared off.

Florida, in Locomobile No. 1, which finished fourth, changed a right front tire at the grandstand at the end of the third round.

Both of the Knox cars, which were still running well when the race ended, stopped for tire changes. The 50-horsepower machine driven by Denison changed one front and one rear tire on account of wear to insure against a blowout, and the 40-horsepower Knox, driven by Bourque, made a change of the two rear tires at the end of the seventh lap, from the studded non-skids to plain tires, after the roads had partially dried, in order to make a gain in speed. It also had some trouble with one of the front tires. At the Locust Grove repair station it stopped for water and also strapped a fresh tire on the rear deck, but made no change there.

Seymour, in Thomas No. 8, stopped at the repair station at Locust Grove on the backstretch to take on water and to put a new tire on the left rear wheel, although to all appearances the tire seemed to be all right. Possibly it was worn and weakened.

The race was a gruelling test of tires throughout from the word "Go!" The instant the clutch was let in at the starting line in the gray dawn, streams of sparks flew from the wheels, due to the friction of the steel studs in the cement surface of the Parkway as the wheels spun around on the wet and muddy surface, unable instantly to overcome the inertia of the heavy cars. With nine miles of cement surface to grind over in each lap, the wear was severe, and on the narrow winding roads on the northeastern corner the stresses due to taking the turns at almost mile-a-minute speeds were tremendous. That mere rubber, cotton fabric, and leather treads could stand up at all under it is marvelous. Each car had two spare non-skid tires on demountable rims strapped on at the back, but only a few had occasion to make any use of them. It is probable that the notable lack of tire trouble was in some measure due to the rain and the use of the steel-studded leather tread shoes, which were better able to stand the grinding and strain than plain rubber tread tires would have been.

Tire Troubles Were a Minimum Race Factor.

Huge wheeled jacks of the kind used in the Grand Prix race in France were employed for making tire changes. They were wheeled under the axle until the upright yokes engaged the axles at an angle, then two men threw their combined weight on the long double handle and the tremendous leverage forced the wheels of the jack beyond the center of gravity underneath, lifting both wheels clear of the ground in one movement. Removable rims were used universally, so that not more than two minutes were required for any change of tires after the race started. No trouble with the rims and their fastenings was reported or appeared evident. In fact, in this race, for the first time in this classic event, tire troubles took a very subordinate place to troubles of another nature.

(Vanderbilt Cup Story Continued on Page 625)

WHAT IS THE BEST MOTOR TIMING?*

By LOUIS LACOIN.

BEING conversant with the various questions of timing and the necessity therefor, we may now examine the diverse solutions which different designers have arrived at. In a table, we have grouped together the timing of a number of well-known motors, the order of arrangement being that of the increasing speeds. The slowest, the *Ours*, makes 1,000 r.p.m. normally, while the fastest, the *Sizaire et Naudin*, turns at the rate of 1,700 r.p.m. These speeds are given in the last column of the table. The first four columns of the same table represent the lag or advance in the timing of the different essentials of a number of motors, counting in degrees from each dead center. The illustration, Fig. 1, shows what a degree is, the circumference of a circle having been divided into 360 degrees, also how the degrees of lag and advance, as shown by the table, have been calculated.

Each of the concentric circles is devoted to the timing of one of the motors, the smallest being that of the slowest motor, No. 1, while the largest is that of the Larrad (see note), placed as in the table, at the last, for want of a better location, as its inventor considers its indications the best for all motor speeds. In short, the illustration represents two turns of the crankshaft, and in order to distinguish any particular timing, the point representing the lag given the opening of the inlet valve should be taken, this being found close to the upper dead center; then turning to the right around the circle until the lower dead center is reached, after which will be found the lag given the closing of the inlet valve. Continuing, the next point is that of the ignition advance, after which the upper dead center is again passed. Toward the end of the third half turn, the lead of the exhaust valve will be found, and after the last half turn, the closing of the exhaust. The regulation of each of the motors in question may be made in this manner in turn.

In order to permit of an understanding of the whole, we will take each one of the different timing arrangements in the order in which they appear on the illustration (Fig. 1). This method of procedure may appear to be the least logical, but it has the great advantage of progressing from the simple to the complicated. The lead given the exhaust, with which we will commence, is, in fact, the best known point in the timing of a motor, while the closing of the exhaust and the opening of the intake, times which frequently overlap, have values, which, according to different designers, vary by considerable margins.

The faster a motor turns, all other things being equal, the greater the amount of advance it is necessary to give the opening of its exhaust valve. It is a self-evident truth that if the speed of a motor be doubled, it travels twice as many degrees in the time necessary to lower the pressure. When considering different motors, as in this case, it is curious to note whether the same law has been observed, and the question may be put in terms of comparison for each one of the essentials of timing. It is this that has led us to adopt the classification of the motors by increasing speeds. So far as the exhaust is particularly concerned,

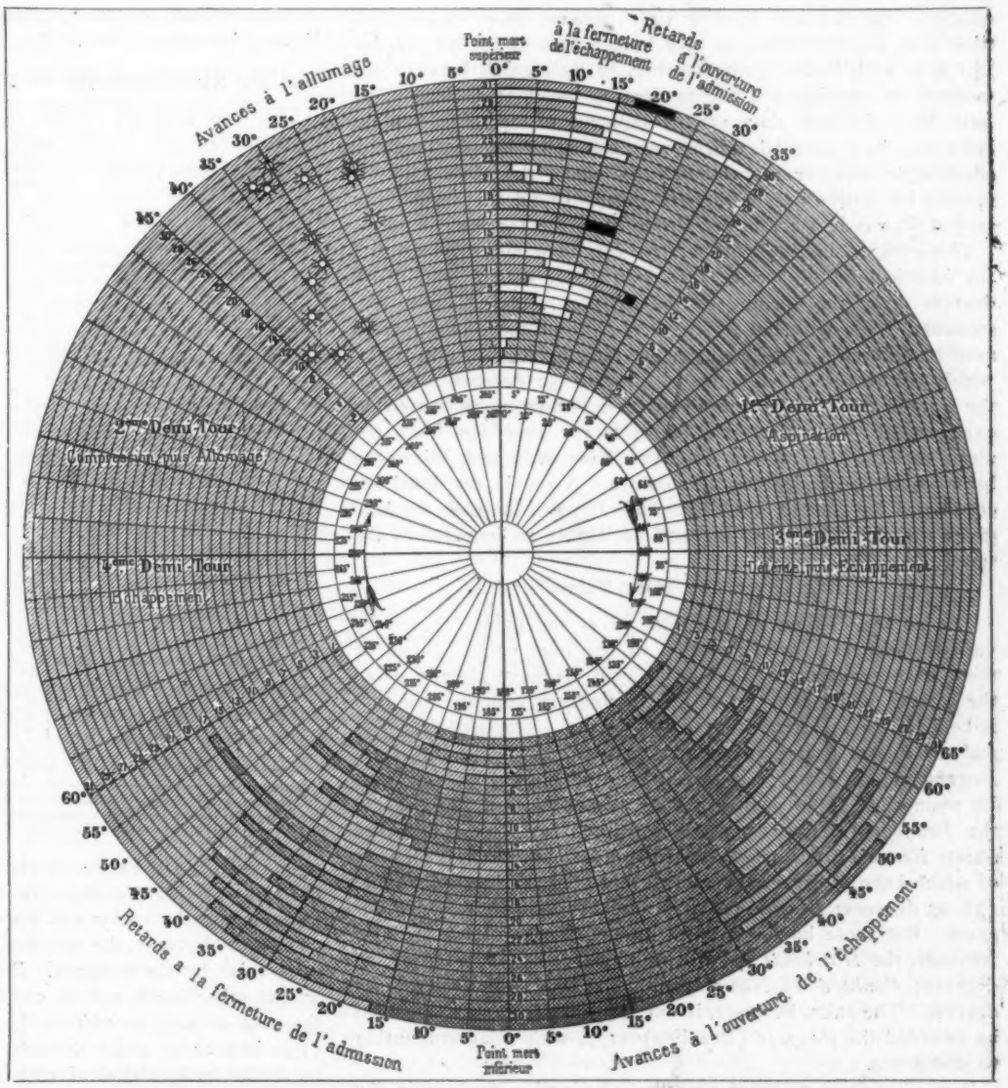


Fig. 1.—Diagrammatic Representation of the Timing of 30 Motors.

Translation—Avances a l'allumage = Advance of ignition.
Point mort superieur = Upper dead center.
Retards—a la fermeture de l'eschappement = Lag of exhaust valve closing.
a l'ouverture de l'admission = Lag of inlet valve opening.
Avances a l'ouverture de l'echappement = Lead of exhaust valve opening.
Point mort inferieur = lower dead center.
Retards a la fermeture de l'admission = lag of inlet valve closing.

*Paper read before the Society of Automobile Engineers at its Cleveland Meeting, September 18-19, 1908. Translated from the French of "Omnia," by Charles B. Hayward.

Note.—The occasion for the present article was the appearance of a device known as the Larrad for indicating proper timing.

Note.—The numbers following the names of the motors refer to their numerical classification in the table, page 606.

a strange fact is to be noted in that the slowest motor, *Ours* (1), has 55 degrees of advance, while the fastest, the *Sizaire et Naudin* (30), has but 44 degrees. The greatest advance, 62 degrees, is in the *Mutel* (11), which makes 1,300 r.p.m., and the least 30 degrees, is that of the *Vinot Deguingand*, which makes 1,500 r.p.m.

It is impossible to lay down an absolute law, but, generally speaking, it seems that the slowest motors shown in the table are those having the maximum lead. Whence this anomaly? Simply because it is essential in designing a fast motor, to allow large openings for the valves and large piping, and these may compensate for the diminution in the lead given the opening of the exhaust valve. It must be recognized, on the other hand, that the more the expansion is prolonged, the less advance is there possible, and the less noisily will the gases effect their escape. The Renault motors (28) perhaps owe to this fact their very silent running, as they have a lead of but 32 degrees. But it is well, before going further, to distinguish between the moment of opening and the manner in which it is done. We have here the sole data of the moment of opening, but the latter may be accomplished brusquely, somewhat like the pop of a champagne cork, or progressively, as where the same bottle is opened by slowly letting the gas escape round the cork. The second plan is less harsh, but slower than the former.

This comparison explains how we can have, side by side, and for identical motor speeds, the *Aries* (25), with a lead of 58 degrees given the opening of the exhaust, and the *Vinot Deguingand* (26), with but 30 degrees. The profile of their cams must be different. The dimensions of their valves may also differ, which is the reason why the advance of 52 degrees, fixed by the Larrad as the best for all motors, strikes us as somewhat exaggerated. However, this figure is not very far from the mean shown by 30 motors which we have examined, this mean being equal to 46 degrees, 20 minutes. A motor regulated according to the Larrad would generally have to increase the lead given the exhaust, which in itself facilitates an increase in the speed.

Lag Given the Inlet Valve.

The second column of the table gives the points chosen by various designers for the closing of the inlet valve. Some of them have adopted the dead center, but we have already given the reasons which cause us to hold a contrary opinion; one that is held by the majority of designers to-day. The *Motobloc* (5) and the *Farcot* (22) give but 10 degrees of lag, while the *Vinot Deguingand* (26) makes it 15 degrees, and a great number have hit upon close to 20 degrees as the proper amount, these being the *Peugeot* (Paris) (13), 18 degrees; *Ours* (1), *Cornilleau Sainte Beuve* (10), *Rochet Schneider* (19), *Eudel* (21), all four of which have 20 degrees exactly; *Mutel* (11), 21 degrees; *Rossel* (3), 23 degrees; *Brasier* (16), 25 degrees; *Renault* (28), 26 degrees. But those having a much greater degree of lag are also frequent, the *Hotchkiss* (7) having 33 degrees; *Berliet* (12), 38 degrees; *Panhard* (6), 40 degrees; *De Dion Bouton* (20), 45 degrees. The palm, however, if our information be correct, must be awarded the *Peugeot* (Beaulieu) (17), with a lag amounting to 58 degrees.

It is interesting to know how much reduction there is in the cylinder volume corresponding to such a great amount of lag in the closing of the inlet valve, and the sixth column of the table gives, for all the motors, the relation of the length of the connecting rod to the radius of the crank. This relation once known, permits of the drawing of a diagram indicating the position of the piston at each angle of the crank. The same result may, however, be arrived at through calculations. Thus we find that the 40-degree lag of the *Panhard* (6) corresponds to a displacement of the piston amounting to 18.7 per cent. of its stroke; the 45-degree lag of the *De Dion Bouton* (20) represents 23.9 per cent., while the 58 degrees given the inlet of the *Peugeot* amounts to 38.4 per cent. of its stroke. Thus the cylindrical volume of the *Panhard* cannot be utilized to a greater extent than 81.3 per cent., that of the *De Dion* 76.1, and the *Peugeot* but 61.6 per cent. In view of these figures, is it any wonder that one should be skeptical as to the ability of the theorist to give the power of a motor merely by inspecting its bore, and without even taking into consideration its stroke?

The motors that we have already cited would have with an equal bore, less power but a higher efficiency, were the inlet valve to be closed sooner. The *Larrad*, which allows but 17 degrees of lag, recommends a timing that would provide a probable increase in power but to the certain detriment of the fuel consumption. On the other hand, this change of regulation would not be unattended by further inconveniences. The capacity of the dead space, in the motors in question, has been calculated with relation to the useful cylinder volume; that is, taking the quantity of mixture that can be imprisoned in the latter. By closing the inlet valve sooner, will it be possible to shut in a greater volume of gas? This increased volume must, nevertheless, be compressed in the same dead space and its pressure

TIMING REGULATIONS OF PROMINENT FRENCH MOTORS.

Nos.		Lead of Exhaust Opening.	Lag of Inlet Closing.	Ignit. Advance.	Lag of Exh. closing.	Lag of Inlet opening.	Relation of conn. rod to radius crank.	R.p.m at full power
1	Ours	55°	20°	var.	0°	15°	4.76	1 000
2	Charron.—20/30 h.p., 1908	44°	0°	—	0°	1°	4.55	1 100
3	Rossel.—40 h.p., 4 cylinders	38°	23°	—	0°	2°	4.29	1 100
4	Gregoire.—10/14 h.p., 4 cylinders, 1908	53°	0°	—	0°	5°	4.18	1 200
5	Motobloc.—24h.p., 100/120 '08	45°	10°	—	5°	10°	4.75	1 200
6	Panhard-Levassor	45°	40°	—	0°	0°	4.5	1 200
7	Hotchkiss.—4 cylinders 95/100	44°	33°	—	10°	17°	4.27	1 300
8	Cottin-Desgouttes.—18/22hp.	46°	30°	38°	8°	15°	4.15	1 300
9	Brouhot.—12h.p., 4 cylinders, 75/110	45°	45°	30°	0°	20°	5	1 300
10	Cornilleau-Ste-Beuve.—20/30 h.p., 1908	56°	20°	43°	6°	20°	4.62	1 300
11	Mutel.—40 h.p., 1908	62°	21°	var.	28°	26°	4.4	1 300
12	Berliet.—22 h.p., 1908	48°	38°	—	9°	17°	4.5	1 300
13	Peugeot (*Paris*).—18/24 h.p. 1908	58°	18°	38°	0°	10°	4.76	1 300
14	Labor.—20/30h.p.	51°20′	0°	var.	0°	0°	4.18	
15	Luc Court	45°	0°	—	15°	30°	4.35	
16	Brasier	45°	25°	34°	0°	7°	4.5	1 350
17	Peugeot (*Beaulieu*)	51°30′	58°	31°	20°	15°	4.78	1 400
18	Aster.—9h.p., 105/120	40°	40°	var.	0°	0°	4.3	1 400
19	Rochet-Schneider. — 24h.p., 100/120	40°	20°	20°	0°	20°	4.75	1 400
20	De Dion-Bouton.— 12h.p. 4 cylinders, 1908	45°	45°	30°	0°	0°	4.7	1 400
21	Eudelin	36°	20°	var.	4°	8°	4.3	1 450
22	Farcot.—14h.p., 80/100	36°	10°	—	2°	6°	4	1 500
23	Chenard-Walcker	36°	36°	—	0°	0°	5.25	1 500
24	Darracq.—10/12h.p., 100/120	48°	30°	21°	0°	0°	4.5	1 500
25	Aries.—14/18h.p.	58°	44°	20°	13°	18°	4.91	1 500
26	Vinot-Deguingand.—12/16h.p. 80/110	30°	15°	27°	0°	15°	4.54	1 500
27	Sultan. — 9/12h.p., 4 cylinders, 75/110	58°	42°	32°	14°	22°	4.55	1 600
28	Renault.—8h.p., 2 cylinders	32°	26°	33°30′	10°	23°30′	4.33	1 600
27	Unic.—20h.p., 75/110	53°	40°	30°	10°	34°	4.5	1 650
30	Sizaire et Naudin.— 15 h.p., 120/110	44°	37°	var.	0°	15°	5.25	1 700
31	Larrad Device	52°	17°	—	22°	17°	....	...

The motors are arranged in this table in the order of their increasing speeds. The angles are figured in degrees, counting from the nearest dead center. "Var." means that the point of ignition may be advanced or retarded by the driver.

will exceed safe limits, so that after several months' running the inevitable carbon deposits that occur will give rise to auto ignition and the motor will knock. It would then be the wisest course to decrease the amount of lag given the closing of the inlet valve by the designer. But the advantages of the *Larrad*, on the other hand, are, in our humble opinion, well justified in the case of such motors as the *Labor* (14) and the *Luc Court* (15), in both of which the inlet valve is closed at the dead center. The compression of such motors must, in fact, have been calculated on the basis of their total cylinder volume, since when running slowly the cylinder would be almost full, while at an accelerated speed the degree of compression would diminish considerably, since the charge drawn in would not fill it to the same extent. But in giving 17 degrees of lag to the inlet, as recommended by the *Larrad*, the motor couple would be improved, and in consequence its power, so that its speed would be increased, and the motor would be capable of high speed, since the exhaust regulation recommended by the *Larrad* calls for a very early opening.

Concerning the Ignition Advance.

The third column of the table contains, more than anything else, the word "variable." Fourteen designers, however, have given their motors a fixed point of ignition, but this point is

far from being the same with all of them. Located 43 degrees in advance of the dead center in the case of the *Cornilleau Sainte Beuve*, it is but 20 degrees away from that point in the *Rochet-Schneider* (19) and the *Aries* (25), so that the ignition advance may be said to vary more than 100 per cent. Here, again, we find ourselves confronted with an anomaly similar to that which we have pointed out in the case of the exhaust lead. In a given motor, the more its speed is increased, the greater necessity there exists for advancing the point of ignition. But the *Cornilleau* motor, with 43 degrees of advance, turns at the rate of but 1,300 r.p.m., while the *Aries*, with only 20 degrees, has a speed of 1,500 r.p.m. The sparking point in the case of the latter motor is probably located more centrally, and it may be also possible that the much faster rate of ignition comes from the greatly reduced dimensions of the motor itself. The mean average of the fixed ignition points represented in the table is found at 31 degrees, 15 minutes.

Exhaust Closing and Inlet Opening.

We have now arrived at the most delicate point of our analysis, that concerning the closing of the exhaust valve and the opening of the inlet. Theoretically, these two points should succeed one another, the exhaust closing at the upper dead center and the inlet opening immediately afterward. We have already given the reasons why we consider it advantageous to close the exhaust valve but a few degrees beyond the dead center, and we have also shown why the inlet can, without inconvenience, open but an instant later. We have shown that the piston cannot drive the exhaust gases out of the cylinder except by compressing them to a degree in excess of that existing in the exhaust valve port and manifold. This excess of pressure may be very feeble, but it is indispensable. At the end of the piston's stroke, or upper dead center, this compression still exists, no matter how little it may be, so that if the exhaust valve be closed and the inlet be opened at that instant, this pressure will prevent the entrance of the fresh gas; worse than that, the exhaust gases will penetrate into the inlet manifold. The movement in this direction is not accentuated, because the piston rapidly begins to aspirate, but it is none the less evil on that account.

However, such designers as the *Panhard* (6), *Aster* (18), *De Dion* (20), *Chenard Walcker* (23), and the *Darracq* (24) follow the errors which we condemn. On the contrary, such as the *Ours* (1), *Rossel* (3), *Gregoire* (4), *Brouhot* (9), *Peugeot* (Paris) (13), *Brasier* (16), *Rochet-Schneider* (19), *Vinot Deguingand* (26) and *Sizaire et Naudin* (30), all close the exhaust at the upper dead center, the inlet opening with a lag ranging from one degree in the case of the *Charron* (2) up to 20 degrees in the *Brouhot* (9). But despite the imposing number of our contradictors, we are still of the same opinion. It is upheld, though somewhat timidly, by the *Farcot* (22), for example, with 2 and 6 degrees of lag respectively, and in a much more positive manner by the *Sultan* (27), with 14 and 22 degrees; by the *Renault* (28), with 10 and 23 degrees, and, above all, by the *Unic* (29), with 10 and 34 degrees. The *Mutel* (11) also opens its inlet valve very late, giving it 26 degrees of lag, but it closes its exhaust valve even later, with 28 degrees past the dead center. During these two degrees, both of its valves are open at the same time. This is a curious method of regulation, but it is one recommended by Larrad, who is of the opinion that the inlet should open 17 degrees beyond the dead center, while the exhaust should not close until 22 degrees have been traversed, or 5 degrees later. This brings up three questions:

1. At what point is it most advantageous to close the exhaust?
2. At what point should the inlet be opened?
3. Is it advantageous to close the exhaust before or after the inlet opens?

Point of Exhaust Valve Closing.

It is well known that the closing of the exhaust valve should be after the piston has passed the upper dead center, but the amount of lag given it should not be as great as that given the closing of the inlet valve. Assuming that the excess pressure of the exhaust equals the depression during aspiration, the time necessary to complete the emptying of the cylinder will be proportional to the volume of gas contained in it. At the end of the admission the volume of gas contained in the cylinder is equal to the cylindrical volume, plus the dead space. Suppose that, for example, to be one litre, for a motor of which the cylindrical volume is ¾-litre, while the clearance has a capacity of ¼-litre. At the end of the exhaust stroke, the piston being at the upper end of its course, the volume of gas is only that of the dead space, or ¼ of what it was and it is accordingly natural to suppose that this excess of burned gas will escape four times faster than the fresh gas will begin to make its way into the cylinder. On the other hand, as the angles described by the crank are proportional to the time, it may be said that 20 degrees of lag given the opening of the inlet, to take a mean figure, should correspond approximately with 5 degrees of lag to the exhaust. In a previous article in *Omnia*, to which reference has already been made, the angles were 16 and 4 degrees. Those of the *Eudelin* (21), are 20 and 4; *Berliet* (12), 38 and 9, and the *Unic* (29), 40 and 10 degrees.

It is evident that no absolute rule can be given here as the losses of the charge in the exhaust manifold are not necessarily equal to those of the inlet. When the muffler is at all choked up, the back pressure may be very high and this consideration has led Larrad to recommend 22 degrees lag in the closing of the exhaust, and 17 degrees for the inlet. This is probably exaggerated, the *Renault* (28), giving 10 degrees to the exhaust and 26 to the inlet, while the *Motobloc* allows but 5 degrees to the former and 10 to the latter. These designers give the exhaust a lag falling between ½ and ⅛ that which they allow the inlet. That is, the lag in each case is proportionately greater than those mentioned, without, however, going as far as Larrad recommends.

It would seem to result from the above analysis that the proper amount of lag to give the exhaust lies between 5 and 10 degrees, and we incline toward the latter figure. Ten degrees represent an appreciable angle and the time required for the crank to turn through it is not negligible, and an important quantity of exhaust gas may escape, but the piston is still very close to the dead center after the crank has traversed it. With a stroke of 100 mm. (3.93 inches), the piston has traveled but 1.5 mm., assuming that all the joints are free from play, but if the big end of the connecting rod has a little, to which must be added that of the upper end, there will be .2, .3 or even .5 mm. to subtract from that length, so that the piston will still be practically at the dead center when the exhaust closes.

(To be continued.)

NEW BOOKS FOR AUTOMOBILISTS.

"My Auto Book," by Walter Pulitzer, just from the press of the Outing Publishing Company, New York, is the most recent addition to the numerous collection of automobile touring memos, if such they can be dubbed, that has appeared in the past year or two. But it has the distinction of not only leaving out a great deal that might better have been omitted from many of its predecessors, but contains considerable in the shape of a running fire of comment, opposite each blank page, for the history of a trip, that will make it worth while, even if the memo pages are never soiled. The "comment" consists of jokes with a gasoline flavor; some of them good, and all of them appropriately illustrated. The author wisely refrains from telling the purchaser of the book how to run his car, and for that much at least, he should be thankful.

"Fly," a New Magazine of Aeronautics.—From the press of Lawson & Kelley, publishers, Betz building, Philadelphia, the initial number of *Fly*, a monthly magazine devoted to matters aeronautical, has made its appearance. Alfred W. Lawson, who is well known as an able writer and author, is the editor.

THE UTILITY OF AUTOMOBILE CLUTCHES

By THOS. J. FAY, E. E., President Society of Automobile Engineers

CONE clutches are not of the class in which a pound pressure of the spring means a pound pressure on the clutch face. The cone serves to multiply the pressure of the spring. In other words, there is a lever advantage in using the cone. Charles H. Schabinger, in the *Horseless Age* of October 2, 1907, set forth a formula, as follows:

$$H.P. = \frac{P f r R}{63{,}000 \sin \Phi}$$; in which

P = the assumed pressure of the spring;
f = the coefficient of friction;
r = mean radius of the cone, in inches;
R = angular velocity, in revolutions per minute;
$\sin \Phi$ = sine of the angle of the clutch.

The formula transposed is as follows:

$$P = \frac{H.P. \times 63{,}000 \ sin \Phi}{f \ r \ R}$$

In this way the spring pressure may be approximated. It is important, however, to use a coefficient of friction such as will serve under practical conditions (Mr. Chabinger adapted the coefficient 0.25) which, in the author's judgment, will not hold in practice for any length of time, if leather is the facing used. If cork inserts are adopted, the coefficient would be a safe one to use, and it might be even higher. The coefficients for cork are given. If the facing is of leather alone, it would be wise to adopt the coefficient 0.15, as before given for an oily condition.

If 40 pounds are all that one would care to hold on the pedal, then it is plain that the value of P should be limited on that account. The ratio would then be 5:1, which ratio can be taken care of in a lever system. On this basis the dimensions of a 50 horsepower clutch, 1,000 r.p.m. would be about as follows:

$$P = \frac{50 \times 63{,}000 \times 0.15}{0.15 \times 9 \times 1{,}000} = 350 = \text{pounds pressure of the spring.}$$

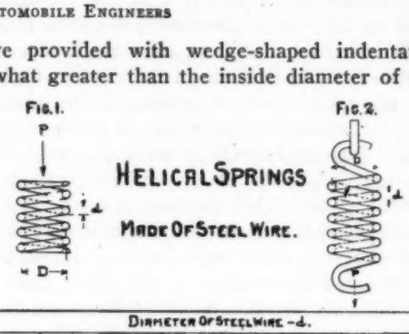
This is for an angle of about 9 degrees and, as will be observed, the spring pressure is somewhat higher than was the wont. This merely indicates the near approach of the limit of the cone type of clutch. The value taken for r is high enough to engender spinning, which is not to be desired, and the value of R is quite as high as it ought to be in a 50 horsepower motor.

Even so, it is a matter to be ascertained, if the ability of the clutch in terms of negative torque, will be adequate for a lasting clutch of the requisite maximum holding power. The constant 63,000 would have to be adjusted to suit the conditions, were it proven that the ability of the clutch in terms of negative torque falls below the desired value, which was set at double the positive torque, *i.e.*, the mean effective torque of the motor.

The question of the spring is one to be looked after with some care, and of it there is oftentimes some reason for believing the right proportions are not arrived at. The table of helical springs here given is one that will help out vastly if it is consulted. For this class of service the maximum carrying capacity in pounds can be taken. The table explains itself adequately. The range of the table is so great that it will handle all the problems of the clutch spring and if more or less than ten turns are desired, it will be possible to figure out the resultant ability with more or less than the ten turns taken in the table. The table was compiled by Max Hesse, while assistant to the author in connection with the Simplex Cars.

Neglecting the question of slipping from the utility point of view, we can take up the matter of the multiple disc type of clutch, with the idea of showing how it can be made to hold with greater certainty than would be the case were the discs plain. The Hele-Shaw clutch, for instance, as will be shown in Fig. 6, is of the multiple disc type, but the discs instead of being plain are provided with wedge-shaped indentations at a radius somewhat greater than the inside diameter of a disc.

Fig. 1. Fig. 2.



Diameter of Spring in Inches	Diameter of Steel Wire—d.											
	1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8
3/4	6.2 1.5	1.7" 65.4 24 .85	221 128 .57"							
7/8	7 .95	2.3" 56.1 15.8	1.15" 189 76.8 .77"							
1"	6.1 .64	3" 49.1 10.8	1.5" 166 31.6 1"	392 162.7 .75"						
1 1/8	5.8 .45	3.8" 43.6 7.1	1.9" 147 34.4 1.27	849 114.2 .95"						
1 1/4	4.9 .33	4.7" 39.3 5.2	2.15" 132 26.4 1.57	314 83.3 1.16"	613 203 .94"					
1 3/8		35.7 3.9	2.65" 120 19.8 1.9"	285 62.6 1.45"	557 153 1.14"					
1 1/2		32.7 3	3.4" 110 15.1 2.26"	262 46.2 1.7"	511 116 1.36"	883 244 1.15"				
1 5/8		30.2 2.4	4" 102 12 2.66"	241 37.9 2"	472 93 1.59"	815 102 1.35"				
1 3/4		28 1.9	4.6" 95 9.7 3.1"	224 30.4 2.3"	438 74 1.85"	757 154 1.54"	1202 285 1.32"			
1 7/8		26.2 1.5	5.3" 88 7.8 3.59"	209 24.7 2.65"	409 60 2.12"	707 125 1.77"	1122 231 1.51"			
2"		24.6 1.3	6" 83 6.4 4"	196 20.8 3"	383 50 2.42"	662 103 2"	1052 191 1.75"	1570 325 1.51"		
2 1/8			76 5.4 4.54"	185 17 3.41"	361 41 2.73"	623 86 2.27"	990 159 1.95"	1478 273 1.7"		
2 1/4			74 4.5 5.1"	174 14.3 3.82	341 35 3.05"	588 72 2.55"	935 134 2.16"	1396 229 1.91"	1967 366 1.7"	
2 3/8			70 3.8 5.7"	165 12.1 4.26"	323 30 3.41"	558 62 2.84"	886 114 2.43"	1329 194 2.13"	1882 311 1.89"	
2 1/2			66 3.3 6.3"	157 10.4 4.78"	307 25 3.77"	530 53 3.14"	841 98 2.7"	1256 167 2.36"	1788 267 2.1"	2453 407 1.89"
2 5/8			63 2.9 6.94"	149 9 5.2"	292 23 4.16"	505 46 3.47"	801 84 2.97"	1196 149 2.6"	1703 231 2.31"	2386 351 2.08"
2 3/4			60 2.5 7.61"	143 7.9 5.7"	279 19 4.5"	482 40 3.81"	765 73 3.24"	1142 125 2.85"	1626 201 2.54"	2280 306 2.33"
2 7/8			56 2.2 8.32"	136 6.8 6.24"	267 17 5"	461 35 4.16"	732 64 3.57"	1098 110 3.16"	1555 175 2.77"	2133 267 2.5
3"			55 1.9 9.05"	131 6 6.8"	256 15 5.43"	442 31 4.53"	701 57 3.88"	1047 96 3.4"	1490 154 3.02"	2044 235 2.72
3 1/8				126 5.3 7.37"	245 13 5.9"	424 27 4.91"	673 50 4.21"	1005 85 3.69"	1431 137 3.28"	1963 208 2.95
3 1/4				121 4.7 7.97"	236 12 6.36"	408 24 5.31"	647 44 4.56"	966 76 3.99"	1376 121 3.54"	1887 185 3.18"
3 3/8				116 4.2 8.6"	227 10 6.86"	393 21 5.73"	623 40 4.91"	930 68 4.3"	1325 108 3.82"	1817 165 3.44"
3 1/2				112 3.6 9.25"	219 9.3 7.4"	378 19 6.46"	601 36 5.28"	897 61 4.62"	1277 97 4.1"	1752 148 3.7"
3 5/8				108 3.4 9.92"	211 8.3 7.93"	365 17 6.91"	580 32 5.67"	866 55 4.96"	1233 88 4.41"	1692 135 3.97"
3 3/4				105 3.1 10.6"	204 7.5 8.5"	353 16 7.05"	561 29 6.27"	837 49 5.31"	1192 79 4.72"	1635 121 4.23"
3 7/8				101 2.8 11.35"	196 6.9 9.07"	342 14 7.56"	543 26 6.48"	810 45 5.67"	1154 72 5.04"	1583 109 4.53"
4"				96 2.6 12.05"	192 6.2 9.66"	331 13 8.06"	526 24 6.9"	785 41 6.04"	1118 66 5.37"	1533 99 4.81"
4 1/8					183 5.7 10.27"	321 12 8.56"	510 22 7.34"	761 37 6.41"	1084 59 5.71"	1487 91 5.14"
4 1/4					180 5.2 10.88"	312 11 9.09"	495 20 7.79"	739 34 6.92"	1052 54 6.06"	1443 85 5.44"
4 3/8		A C B			175 4.7 11.46"	303 10 9.65"	481 18 8.25"	718 31 7.24"	1023 50 6.42"	1402 76 5.78"
4 1/2					170 4.4 12.03"	294 9 10.19"	467 17 8.73"	698 29 7.64"	994 46 6.79"	1363 70 6.11"
4 5/8					166 4 12.92"	286 8.3 10.76"	455 15 9.22"	679 26 8.07"	967 42 7.16"	1326 64 6.46"
4 3/4					161 3.7 13.62"	279 7.7 11.35"	443 14 9.75"	661 24 8.51"	941 38 7.57"	1291 59 6.81"
4 7/8					157 3.4 14.38"	272 7.1 11.96"	431 13 10.32"	644 23 8.97"	917 36 7.97"	1258 55 7.17"
5"					153 3.2 15.09"	265 6.6 12.58"	421 12 10.78"	628 21 9.43"	894 33 8.39"	1227 51 7.55"
Deflection in Inches	57/64"	1 25/32"	2 11/16"	3 9/16"	4 15/32"	5 3/8"	6 1/4"	7 5/32"	8 1/32"	8 15/16"

A - Maximum Carrying Capacity in Lbs.

B - Deflection at This Load for a Spring With 10 Coils.

C - Coefficient of Stiffness, Which Can Be Used for Calculating the Deflection of a Spring With N Coils: $\delta = \frac{P \cdot N}{32 \cdot C}$

The utility of the wedge-shaped indentations would be the same as that of the cone bearing surfaces of the cone clutch.

In the Hele-Shaw clutch it is not necessary that the discs should bear upon their faces, since the clutching effort may be confined to the engagement of the wedge-shaped depressions. A clutch of this sort has but a small bearing surface per disc, thus making each disc very effective, and as to the effect of the high pressure on the small surface, it is compensated for by the use of a considerable number of discs. The discs themselves are very thin, and it is possible to use a considerable number of them within limited space. The other features of this clutch will scarcely require attention, since they are plainly shown in the illustration, and the idea here is to point out the difference between this and simple multiple disc clutches.

Concerning Spiral Band Clutches.

The Mercedes type of spiral band clutch is probably the best known of any in this class. It consists essentially of a flat helical spring wrapped around a hardened steel drum. One end of the spring is anchored to the driving member and the other end is actuated by means of a spring pressure through a lever arm. Intervening the spring and the lever arm is a sliding cone with a face-angle of about 52 degrees, ending in a crest and a slight reduction in the diameter beyond. The spring pressure is thus multiplied, first through the good office of the lever arm; second, by the wedging action of the sliding cone, and, finally, by the wraps of the helical band around the drum. There are usually from four and one-half to five wraps of the band on a drum approximating 6 1-2 inches in diameter, differing slightly in this respect in the different types of cars. The drum is of hardened alloy steel, the texture of which metal is so very close as to permit of extremely high pressures without any eroding effect at all. If the drum is hard, it is true that the helical bands must not only be hard as well, but of high strength, since the pull on the wrap nearest to the anchorage reaches a very high figure indeed.

There is a certain amount of complex mechanism in connection with clutches as above described, and the clutch, Fig. 7, while it belongs to the same genera of clutches, is designed with the idea of eliminating the complex features. In this spiral band clutch the helical band is wrapped around a drum of the cone type; one end of the flat band is anchored to the driving member, while the other end is free. To engage the clutch the drum itself is caused to telescope the helical spring and by a difference in angle between the drum and an outside housing the free end of the spring is pinched in such a way as to constrict the same, thus affording the requisite negative torque to transmit the torque of the motor.

In this type of clutch freedom from lever arm troubles is a self-evident feature, but if the lever arm is eliminated, high pressure has been substituted instead, and this high pressure comes on a small area at the end of the helical band, which should in time erode the band itself or cause it to burrow into the surface of the drum in juxta-position. These evil influences can only be counteracted if the materials used are of a character to afford the greatest possible hardness without brittleness. In one or two cases it was suggested that a hardened tool steel insertion be used at the point of maximum pressure. This might be a good idea, but the author does not know of any case in which this has been taken advantage of.

While the industry has developed a considerable number of clutches now obsolete, yet even so there are one or two ideals that persist in coming to the fore at rather frequent intervals. Take, for instance, the question of an individual clutch for each of the speeds in the gear-set. This scheme has been used quite extensively, and has many advantages, among which might be mentioned the fact that the gears are retained in constant mesh. A scheme of this sort resolves itself into the question of whether or not a separate clutch for each gear is preferable to a single clutch for all of the gears and a sliding mechanism by means of which the gears may be engaged. There are very few apparently whose preference seems to run in the path of multiple clutches to get away from clashing gears.

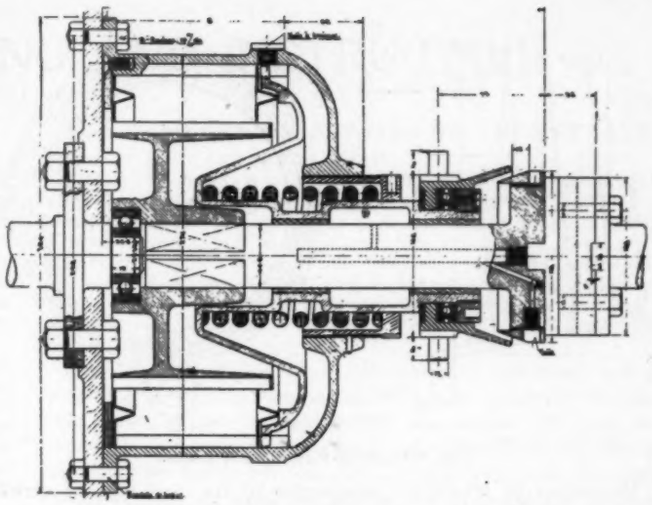


Fig. 6.—Sectional view of the new Hele-Shaw clutch.

There is still one more idea that seems to be buoyant, although it has not been exploited to any great extent up to the present time. This idea has for its basis the use of a unit clutch in the ordinary way, and the gears in the gear-set in constant mesh. In order, however, that the speeds may be changed, sliding cones provided with slots, teeth or other means of engagement afford the methods by which the respective gears in proper selection are locked in place and set to perform their functions.

Obviously this is a means for side-stepping the clashing of gear teeth, hoping thereby to save them from the results of clashing, but it must be plain to even a casual observer that the trouble is merely transferred to another point. It seems to be true that there is less wear and tear due to the clash meshing of gear teeth than follows the use of other means of locking members, such as pins, a screw-driver joint, etc.

The Question of Lever Advantage.

It was said that if the engaged faces of the clutching members were direct the pressure of the clutch spring would have to be sufficient, in view of the coefficient friction of the materials used for the clutching purpose. It was pointed out in the case of the Mercedes clutch that an intervening lever arm might be devised in some way as to multiply the pressure of the spring, and it was there intimated that a cone-face might be so shaped as to afford a further lever advantage, due to the wedging action. The use of the spring tabulation previously given will be much facilitated if information is at hand bearing on the question of the lever advantage.

It is easy enough to see to what extent a lever arm will decrease the needs by way of a spring. It will be remembered also that a means was afforded for determining as to the magnitude of the advantage if the simple wedge is used in connection with a lever arm. Nothing remains, therefore, but to exploit

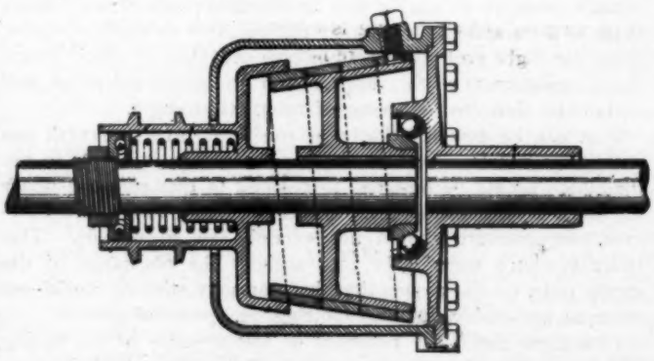
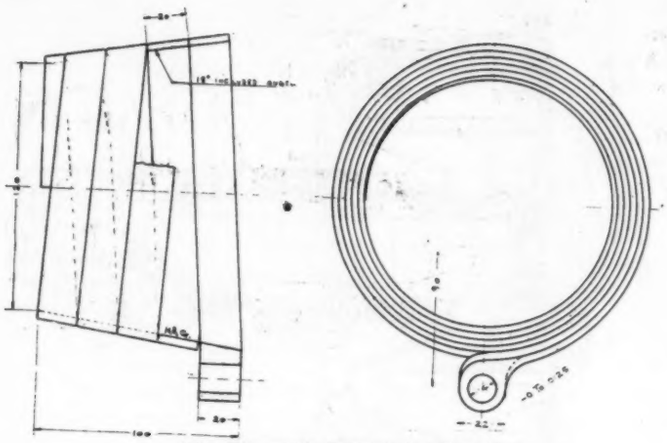


Fig. 7.—Cross section of the Ellsworth-Fay clutch.



The Ellsworth-Fay Clutch Band.

the means by which the advantages of the cone-type of clutch may be fixed.

The first question is one involving the disengagement of the clutch. To engage is a necessity, and to prevent slipping is desirable, but, as before stated, we must know that the disengagement will be sure. With metal to metal contact, considering such metals as are likely to find their way into clutches, the disengagement would not meet with any unusual conditions. If, on the other hand, leather (or such other materials as would act in the same way) be used, it can be the cause of sticking, and the disengagement might be attended with unusual difficulties, *or becomes quite impossible.*

If a cone clutch is allowed to slip for a time it will get hot. If it is then allowed to stay engaged for a considerable period it will disengage with difficulty. The prime reason for this lies in the fact that during the period of slipping the female member (of metal) will be heated more than the male and will expand more. The members will then nest closer and when the clutch members cool off the engagement will be under far greater pressure than that due to the normal pressure of the spring.

Leather faced cone clutches, then, are not suitable for the class of work in which slipping is intentional, with a view to controlling the speed of the car, even for a short time. The expansion of the male member due to heat will be as follows:

$$e = (1 + f \times {}^{\circ}F)\ D.$$

In which

e = total expansion due to heat.
f = the coefficient of expansion of the materials.
°F = increase in temperature in degrees F.
D = mean diameter of the member, in inches.

It will be well to take into account the fact that the male member is insulated as against heat, the leather acting as an insulator, so that little or no expansion will be noticed in that member.

Since slipping cannot be prevented with certainty, an allowance should be made in the designing of the pedal system, such as would assure to the operator unquestioned ability to apply enough pressure to enable him to disengage the clutch. Since there is a limit to the ability of the operator to apply pressure, there should be such a lever advantage provided as would assure the disengagement of the clutch with a predetermined effort well within the ability of a person of no great strength.

If it can be assumed that a person of no great strength can press on a pedal on a basis of 100 pounds, then it is safe to say the clutch should be designed to respond to that pressure under the most severe conditions. Under ordinary conditions, however, the pressure should not exceed, say 40 pounds. This latter pressure would take into account the resistance of the spring only, on the assumption that normally sticking would not ensue in reasonably designed clutches, in correct alignment.

In a cone clutch the resultant of the pressure of the spring will be greater than that pressure. The coefficient of friction, however, undergoes the equivalent of a change, in that the coefficient becomes much diminished during the time the members are engaging, because of the manner of the engagement. This is explained on the basis of the effect of screwing one member into the other, as it were, which is what happens, since during the act of engaging the driving member if at a higher angular velocity while the driven (male) member is being pressed deeper into the engaging position. The result is, a point on the periphery of the male member will describe a spiral orbit during that period.

Members that cannot be telescoped at all by fair axlewise motion may readily telescope if the spiral motion is imparted to the one of them. It matters not at all if there is an actual diminution in the coefficient of friction, since the resultant of the process is the equivalent of a diminished coefficient.

Pressure on cone faces:

$$N = \frac{P}{\sin a + \text{tang } \phi \cos. a} = \text{total normal pressure between cone faces.}$$

$$P = N \sin a$$

The motor ability must be less (somewhat than the value of N). This ability would be found as follows:

$$P^1 = \frac{2 \pi r S}{\text{H.P.} \times 33{,}000}$$

in which

r = mean radius of the cone clutch.
s = angular velocity r.p.m.
H.P. = actual delivered horsepower of the motor at the speed s.
P^1 = pull, in pounds, at the periphery of the cone clutch.
$P = P^1 \times 2$ for clutches that should sustain under severe conditions.

SOMETHING ABOUT SPRINGS.

If a short leaf breaks, even though it may be an intermediate member of a spring, it is a good sign that the camber of the broken leaf was greater than that of the other leaves. Since the fiber strain would be the same in all the leaves were they all of the same thickness, and curved to the same radius, it is fair to reason that any one leaf curved to a shorter radius will be subjected to an excess fiber strain and will rupture the sooner in consequence.

It is very likely that a spring on the whole will work better after the short leaf, with its excess camber, is eliminated. At all events, such an occurrence on the road should not be a source of great annoyance to the motorist, since the remaining unbroken leaves will be in no greater danger of breaking than they were before. Indeed, the unbroken leaves may be in prime condition, since it is possible that the broken leaf of the excess camber sustained more than its share of the work up to the time of rupture.

Sometimes these seemingly unaccountable breakages of intervening plates (leaves) in the springs are due partially to excess camber and for the remaining part to loose clamping. No spring of the laminated type will sustain in service, if it is not tightly clamped. It is not enough to tightly clamp the springs to the spring seats on the axle. The material should be superior to that of ordinary vehicle bolts and of greater section, because much is to be gained by affording seat of the radius in conformity with the radii of the spring plates. A leather facing skived to the curvature of the main leaf of the spring is of great value. primarily because it lends friction to the clamped members, and again because it yields to the high spots, and more closely nests the clamped spring to the seat. A properly clamped spring to the spring seat with an intervening leather pad will scarcely give trouble at all.

It is a waste of time to use spring clamps of indifferent material and small section, in work of this character, because the clamp itself will yield, and allow the spring to go adrift. The clamps must be of good material and of adequate section to maintain a tight relation, in order that tight clamping may be a continued condition.

LETTERS INTERESTING AND INSTRUCTIVE

PERTINENT POINTERS FOR THE SALES END.

Editor THE AUTOMOBILE:

[1,597.]—I would like to ask through your "Letters Interesting and Instructive" if there are any automobile manufacturers who offer premiums to users of their machines, making the best suggestions as to points of improvement on their respective cars. Are there any automobile manufacturers who make it a point to keep duplicate parts of their machines in all large cities, so that broken parts can be quickly replaced? Is it asking too much of a dealer when he tries to sell you a car if he expects to carry duplicate parts in stock?

Would not an effort on the part of automobile manufacturers to help more those to whom they have sold machines in the past, than to make such heavy cuts to facilitate the sale of new ones? Take, for instance, the cash register people and the Remington typewriter people; once a customer they count you as a friend and customer always, and are continually sending you such information as will help you in getting all possible out of the purchases that you may have made. R. T. H.

Port Norfolk, Va.

So far as our knowledge extends, there are no American makers who are offering any premiums for information of this kind, though prizes have been held out for records of the lowest maintenance expense on the greatest mileage, and at least one of these is still effective. There are few of the larger American automobile manufacturers who do not carry very complete stocks of replacement parts in their branches in different cities, and several have made it a point not only to sell these parts at prices corresponding to their first cost on the machine itself, but also to supply them very promptly.

The question regarding parts would be a most natural and logical one, and is usually asked under such circumstances. We agree with you most heartily regarding the value of the policy of "once a customer, always a customer," and are under the impression that this is closely followed by the majority of well-known makers.

HOW TO LEARN THE AUTOMOBILE BUSINESS.

Editor THE AUTOMOBILE:

[1,598.]—I am employed in an automobile repair shop where I am supposed to be learning the automobile business, but am not given a good opportunity of doing so, owing to being given other work to do. I would like to have you inform me whether there is not some way of learning this without interfering with my work and without going to an automobile school. Would it benefit me any in my work to take up the study of gas engines?

Chicago, Ill. OTTO L. HARTMANN.

You do not state what branch of the business you wish to learn, whether designer, salesman, repair man or chauffeur, or what is the nature of the work to which you are assigned; but if this work is in any way connected with the repair shop, it ought to be of use to you. If not, why not try some other repair shop? That is certainly the best place to learn. We do not believe that it is possible to learn the automobile business, or any other business, without devoting one's whole time to it. The study of gas engines would certainly be of benefit to you, but it would be better to get a practical knowledge of them first.

ANOTHER WHO UTILIZES HIS OLD CASINGS.

Editor THE AUTOMOBILE:

[1,599.]—I find it unnecessary to rivet or tie on with rawhide old shoes with beads cut off. Simply put on with the new tire slack and blow up. I have some that have been run a thousand miles over rough mountainous roads and they have not crawled one-sixtieth of an inch by a mark I made. This is much less work to remove, in case of a puncture. OWEN B. AMES.

Fairfield, Me.

There is certainly no advantage in troubling to rivet or lace on the old casings when it is desired to use them to protect new ones if they stay in place when simply put on slack and then blown up. This simplification of the process should encourage other automobilists to try it—many of whom, no doubt, hesitated at the work involved in the other methods.

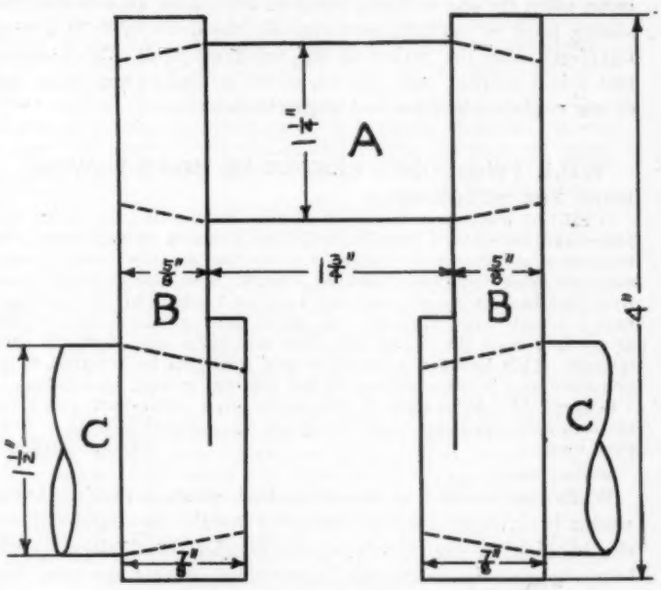
PARTICULARS OF A BUILT-UP CRANKSHAFT.

Editor THE AUTOMOBILE:

[1,600.]—Enclosed is a rough sketch of a built-up crankshaft with dimensions. My idea is to have the discs B made of cast iron or phosphor bronze and to have the crankpin C and wristpin A tapered and keyed to the discs. The dimensions given are the only ones possible for me to use. The pins I plan to have made of tool steel, hardened, ground, and highly polished. Do you think a crank of this kind would give satisfaction? Thank you for any help you may give me. BUILDER.

New York City.

It is difficult to tell what satisfaction your crankshaft will give without knowing the size and other data of the cylinder. Moreover, your object in making the pin smaller than the main journal is not apparent. You say these dimensions are the only ones possible for you to use, but it would seem that the requirements of such an important part of the motor as the crankshaft should not be subordinated to any others. There is no particu-



Proposed Design for a Built-up Crankshaft.

lar advantage to be gained by making the crank cheeks discs instead of rectangular, as shown in the drawing; the extra material would only be wasted. The drawing does not show nuts to hold the discs on the tapered ends of the pins, but these, of course, should not be omitted. We think it would be the best economy, however, for you to have your crank forged in one piece by some concern with the proper facilities.

PUZZLING KNOCK WHEN CLIMBING ON THE HIGH.

Editor THE AUTOMOBILE:

[1,601.]—In your "Letters Interesting and Instructive" please give me some advice on the following: I have a 35-horsepower, four-cylinder, shaft drive, '08 car. There is a certain kick in this car when pulling up a heavy grade on the high gear with the throttle wide open. This kick or back-lash feels as if the whole machinery was locked. The car vibrates the same as a car does when, in coasting down hill with the motor dead, the clutch is suddenly dropped in to pick up the motor; that is, a sudden jarring or jerk backwards, like the gears locking in the differential. The car has always done this.

I thought at first that it was in the rear axle, it being the same sometimes as if the bevel gears should fail to mesh and the teeth should lock on top of each other. On examination of the axle, I found the bevel slightly cut. I put in a new axle, which I have run for 1,500 miles, which is not worn, but still have the same trouble. Sometimes on releasing the clutch when this kick occurs the car will coast for a few feet, but on dropping in the clutch again to pick up the motor it will vibrate as before.

When the muffler is cut out it seems as if this kick comes on a

very weak explosion; at other times the explosion seems about half as strong. This, of course, occurs when the car is pulling about 80 per cent. of its capacity on an up grade, the throttle wide open, yet it does not feel like a miss. The position of the spark lever makes no difference. Sometimes the car will kick several times and still pick up and go ahead, at other times it will kick and stop. The feeling is exactly as if the machinery was suddenly locked. I have had experts, some from other cities, trying to locate this trouble, but all have failed. I will value the car $200 higher the minute I locate this trouble. Can you give me any idea of where to look further? SUBSCRIBER.

Duluth, Minn.

From your description it seems as if the trouble ought to be in the running gear or transmission rather than in the motor. However, replacing the entire rear axle should certainly have stopped the kick if the cause was in that member, so we should suggest examining the change-gear. It is possible that the reverse pinion may be loose and slip partially into mesh when the car is inclined on a grade, or the shifting mechanism may allow the sliding member for the low gear to engage, if the change-gear is of the selective type. In the latter case, however, this looseness would have made itself apparent in other ways. Another possibility is looseness in the universal joints. If the "kick" seems to come when the car strikes a bump in the road it may be that the sliding joint in the rear universal (if the drive shaft has two) interferes with the action of the universal itself. We confess that it is a puzzling case, and we would be glad to hear from any of our readers who have had similar difficulties.

WILL TWO PORTS RESULT IN MORE POWER?

Editor THE AUTOMOBILE:

[1,602.]—I have been a reader of your publication for about two years and have every copy where I can locate it at any time. My manner of preserving the copies is to lay two months' issues (about eight or nine volumes) together evenly, then clamp them there with two 18-inch boards and two 3 3-4 by 1-4-inch bolts, then bore four 1-4-inch holes through the whole pack about three-quarters of an inch from the backs, and then lace them with common shoe strings. This keeps the copies where they can be referred to at any time and is little bother, whilst the cost is next to nothing.

I would like to inquire if the power of a three-port two-cycle motor would be likely to be increased by converting it to a two-port motor? SUBSCRIBER.

Moline, Mich.

While your method of preserving back numbers of THE AUTOMOBILE is certainly one that makes for solidity and durability, we should think the same laudable objects might be obtained, as has been the case in automobile construction during the past five years, with a little less avoirdupois. As you say, the cost of your method is not very great, but for actual service, a good ready-made binder obtainable for very little from any stationer, would compare as good steel does to a cheap casting.

Specifically, we cannot say what will happen if the particular motor to which you allude were to be changed over from a three to a two port proposition. Taking an abstract case, the respective motors properly designed and suitably constructed would compete with each other under favorable circumstances as respects ability to deliver power.

GRAPHITE AS A CYLINDER LUBRICANT.

Editor THE AUTOMOBILE:

[1,603.]—Kindly tell me if graphite is a perfect cylinder lubricant without being mixed with oil, in an engine in which the short-circuiting of the ignition current is of no importance. How high a temperature will graphite stand without losing any of its lubricating qualities? Does it leave a carbon deposit similar to that of oil? Can it be fed through a gravity-feed oiler? READER.

St. Louis, Mo.

Graphite is one of the best lubricants known for any purpose. The only objection to its use in automobile cylinders is that it is likely to clog up the oil pumps and leads. Its lubricating qualities are independent of the oil, and if you can devise a reliable method of feeding it without mixing it with oil you will certainly get satisfaction. It will stand any temperature usually found in a gasoline engine cylinder; the temperature at which it decomposes will naturally depend on the grade, and the manufacturers will be able to advise you better concerning this. A gravity-feed oiler would not be suitable; force-feed is necessary. But why worry about graphite if you have invented an engine in which the short-circuiting of the ignition is of no importance?

IS THE MAGNETO LESS TROUBLESOME?

Editor THE AUTOMOBILE:

[1,604.]—Will you please inform me through "Letters Interesting and Instructive" if you think a magneto for a 30-horsepower four-cylinder car is worth the extra expense? Also, what will a good one for the jump spark system cost? Will it be any more trouble to keep in working order than the battery system, with batteries, coils and commutator? PROSPECTIVE OWNER.

Asheville, N. C.

The magneto will certainly afford you adequate compensation by way of reduced ignition troubles and increased power, in spite of the fact that you can pay as much as $200 for a magneto, inclusive of its fittings, ready for installation. Magnetos for the jump spark system can be had at prices ranging between $100 and the high limit as above set down. The magneto will be less troublesome to maintain, requiring but little occasional care, by way of cleaning and oiling; during its natural life, which for a good magneto, is equal to the life of the motor.

OIL FOR COOLING IN COLD WEATHER.

Editor THE AUTOMOBILE:

[1,605.]—I would like to inquire through your "Letters Interesting and Instructive" whether a very thin oil could not be used for cooling in the winter in place of an anti-freezing solution. Also if the results would be as good, and if the cost would be any more, and how often the oil would have to be changed to get the best results.

Boylston Center, Mass. A. R. BENNETT.

Oil has often been used for this purpose, and we believe that one of the large manufacturers advertises a special brand for use in cooling systems. The results will be all right, but you will probably find the oil more expensive than the ordinary calcium chloride solution. There would be no necessity of changing the oil during a single season, but more would have to be added from time to time to make up for evaporation. Perhaps some of our readers who have used oil can give you the benefit of their experience.

MAXIMUM SPEED OF AUTO AND CYCLE MOTORS.

Editor THE AUTOMOBILE:

[1,606.]—What is the highest speed attainable in four and six-cylinder four-cycle automobile engines, and in four-cylinder motorcycle engines? G. L.

St. Paul, Minn.

The speed depends on the load, the size of the motor, and many details of its design. For the average automobile motor, either four or six-cylinder, the maximum speed under load may be taken at about 1,500 r.p.m. If the motor were allowed to "race," running idle, it might turn as high as 2,500 r.p.m. For motorcycles, the figures might be about 2,000 and 3,000 r.p.m., respectively. In motors for every-day service, the piston speed, under load, rarely exceeds 1,200 feet per minute, and this, of course, determines the number of revolutions.

REGARDING THE FORM OF LUBRICATION.

Editor THE AUTOMOBILE:

[1,607.]—The recent stringent measures taken by the police in New York City against the drivers of machines emitting smoke from their exhaust and the probability of equally stringent action on the part of local governments in other districts, renders it necessary for manufacturers either to subtract from the efficiency of their cars or to revise the systems of lubrication which they have adopted. Since in the great majority of cases the only sign of sufficient lubrication for the engine has been the emission of a slight blue smoke from the exhaust, makers, in many cases, advise customers to make sure that their exhaust is smoking continuously.

Realizing the hardships that such regulations impose upon makers of such cars, it is not out of place to consider the various general efficiencies of lubricating systems in vogue. The most usually employed is the splash system, in which the connecting rod-ends whip the surface of oil in the crank base, so throwing

it to the cylinder walls and other moving parts. In the crudest form—the most common, by the way, of this system—the oil is fed direct to the crank bases and only about 5 per cent. of it is effective for lubrication. If the oil level is too high, the engine will foul and the exhaust smoke; if too low, the engine gets no oil with disastrous results.

The anti-smoke properties depend entirely upon the accident of the driver accurately gauging the feed to the crankcase to supply oil as used, a condition which varies, however, with the immediate mechanical quality of the car and also with different oils.

In an improved form the oil, in considerable quantity, is carried in a lower chamber or sump, whence it is automatically pumped to the crank bases, being kept therein at a constant level by means of a simple overflow device. This system is infinitely better than that previously mentioned, since about 60 per cent. of the oil carried may be used before trouble will occur. But the question of a smoky exhaust depends upon a very accurate gauging of the capacity of the overflow from each and every one of the crank bases. Moreover, there is in this as in every splash system, the serious disadvantage that the copiousness of the lubrication bears but little relation to the work imposed on the engine.

Attached force feed lubricators entail a complication of tubes likely to clog or leak and again depend upon an accurate setting, which necessarily varies with different engine speeds and for which a happy average only can be struck, a state of affairs not in accordance with the high efficiency necessary with the modern automobile built for a critical purchaser.

By far the best system in every way is that in which a force pump draws oil from a sump, forcing it by means of suitable ducts in the main bearings through passages in the crankshaft to the crank pins, thence to the piston pins, whence it escapes back to the oil reservoir, the cylinders being lubricated by the oil thrown by centrifugal force from the crank webs. Since the force pump is driven from the engine, the pressure in the oil system is directly proportional to the speed of the engine—the flow equally so, as is also the amount thrown from the crank webs to the cylinders. It is this system—to some makers a new idea—which we developed on the Marmon car some six years ago and which we have always used. It is this system also that has rendered possible—as records show—the extraordinary speeds for extended periods which have been made upon the Brooklands track in England. With it not only is perfect lubrication of every engine part absolutely insured, but the whole quantity of oil in the system may be used up before lubrication fails.

Provided the by-pass is correctly set, it is impossible to make the engine smoke; the whole system is integral with the engine without exposed pipes to leak, or indeed any to clog. Once tested and the by-pass set, the driver may forget once and for all, except for a very occasional replenishing, his lubrication system, and also be happy in immunity from an annoying arrest for an offence which is primarily due to the maker neglecting to use the best available system for that most important of all the functions in the operation of automobile mechanism—lubrication.

I write this, since, with many low-priced and attractive cars before the public for the coming season, it is necessary for a buyer to examine such matters closely, both to comply with a soon-to-be universal regulation and for the sake of his machine's general efficiency and freedom from repair.

Indianapolis, Ind. HERBERT H. RICE.

AN ENTHUSIAST ON UNREASONABLE LAWS.

Editor THE AUTOMOBILE:

[1,608.]—The canal came first, then the steamboat, then the steam railroad; the horse-drawn street car was superseded by the cable car, and it in turn by the electric street car. The jinriksha, or man-drawn cart, was superseded by the ox-team, and it by the horse—and it in turn by the automobile. And so it comes to pass that we to-day are enabled to cover great distances quickly and are fast becoming one great community. As a natural sequence to the fulfillment of the inexorable law of progress has come to pass the advent of the automobile. The same spirit of antediluvian ideas that opposed the progress of rapid transit heretofore to-day are bitterly opposing the automobile. It is the tendency of men to go to extremes, first too far one way, and then too far the other way, until finally a middle course acceptable to the great majority is reached.

The present road laws are the extremes of restriction, unjust and discriminating detrimentally to the automobile. Towns, villages, and cities that pass speed limits of 8 to 10 miles an hour overshoot the mark of reason and sense. If laws were passed limiting the speed of automobiles to 10 miles in congested sections of towns and cities and 15 miles in the free sections, with 20, 25 to 30 miles in the country, they would be reasonable, would be easily adhered to, acceptable to all sane automobilists, and work out quicker than any other measure the desired end of safety. Ten miles an hour, except in the most congested business sections, is perfectly ridiculous. Fifteen miles an hour is the happy medium and safe. An automobilist who will drive even out in the open country over 30 miles an hour should not be fined, but sent to jail, because he has gone to the other great extreme.

Now, what we are advocating is a reasonable, fair, and happy medium of speed limitations. It is what will come ultimately, and the quicker adopted the quicker all drivers of automobiles will fall in with hearty accord and aid in its maintenance.

Oil City, Pa. ONE AUTOIST.

"INDUCEMENTS" TO AUTO SALES AGENTS.

Editor THE AUTOMOBILE:

[1,609.]—A sales company controlling the sales of a popular car in the State of Minnesota offer the following "inducements" to dealers: The dealer must deposit part of the payment of five cars without any security whatever with the sales company, must not sell any other car without permission from the sales company, and must keep in stock four different styles of the car for demonstration. The dealer must sell at the price which the manufacturer may set, no matter whether below what he has paid for the car or not, and if he fails in any particular to live up to the contract his deposit is forfeited to the sales company. This business proposition seems to me to be the worst jug-handled, sucker-catching scheme that ever went under the name of legitimate business. The sales company ask the dealers to furnish them capital to do business with, with absolutely no security or recompense, arranged so that the deposit may be declared forfeited at their own sweet will, and do not even agree to furnish the cars which the deposit is part payment upon. They limit the business of selling to their permission and compel the dealer to keep in stock models which may not be salable in his locality.

In my opinion, this method of selling automobiles to dealers will spell suicide for the manufacturer if it is rigidly enforced. It will stimulate the most zealous antagonism to the car and will enlist good agents in the ranks of salesmen for other cars.

Marshall, Minn. A. D. HARD, M.D.

A GASOLINE SPRAY FOR CLEANING MOTORS.

Editor THE AUTOMOBILE:

[1,610.]—I note letter No. 1,587, by F. C. Snedeker, in regard to cleaning the engine of an automobile with gasoline spray from a tank in which the air has been compressed. Will say for his information, that in 1906 I received a circular from a concern in Utica, N. Y., in which one of their special offers was the "New Lightning Automobile Cleaner," consisting of a four-gallon galvanized iron tank with air pump attached. They state that one gallon of gasoline and one pint of kerosene put in the tank, and the air of same compressed, would instantly remove grease baked on the engine.

This appealed very strongly at the time to me, but never having heard of it before or seeing it advertised after, I thought perhaps it was not much of a success, and so failed to carry out my intentions of ordering one. The price was $6.

I agree with Mr. Snedeker that I believe something on this order would be a very useful article for owners of automobiles, and would find a ready sale. I am writing the Utica concern to-day to see whether they still manufacture this cleaner.

Middletown, Conn. G. ELLSWORTH MEECH.

DR. KRESS GETS MANY DECARBONIZER INQUIRIES

Editor THE AUTOMOBILE:

[1,611.]—Since my letter in the October 1 issue, headed "Concerning the Use of Decarbonizer," I have received many letters asking for more complete information. Since I do not have the time to answer all these numerous letters, I would ask that you make known that it is the Radium decarbonizer which I use, and the oil is of the Monogram brand, and the car which I drive is a Franklin. The other night I was called out of my bed to answer a long-distance telephone from Philadelphia in regard to more complete information.

I have no personal interest in the decarbonizer, the oil or the car, and simply wrote the original letter for the benefit of my fellow automobilists and thought they could get some good results from my own experiences. PALMER J. KRESS, M.D.

Allentown, Pa.

ANOTHER CURE FOR POPPING CARBURETER.

Editor THE AUTOMOBILE:

[1,612.]—In answer to No. 1,578, this will probably cure the trouble: Put in a new set of dry cells; see that vibrator points are clean; adjust vibrator to give a good hot spark. Then turn needle valve on carbureter entirely down, and open it three-quarters of a turn. Now start engine, and move needle valve up or down a very little until motor runs smoothly, and go on your way rejoicing. Be sure to connect up dry cells as the instruction book says, six cells in multiple series. I have a Mitchell, too.

Corsicana, Tex. CLARENCE THOMAS.

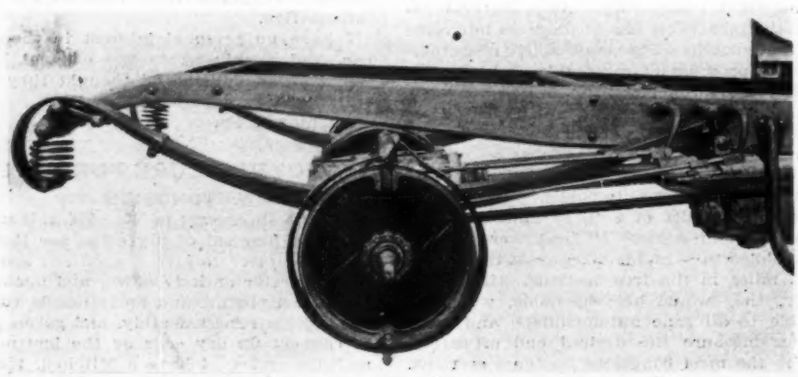
THE Rambler design for 1909 exemplifies the usual policy of continuing former models, with only such refinements in detail as experience has shown to be desirable. The two-cylinder 22-horsepower and the four-cylinder 34-horsepower cars follow very closely the coresponding designs for 1908. There is, however, an entirely new four-cylinder model of 45 horsepower, selling as a roadster or touring car at $2,500. Various styles of runabout, touring or limousine bodies may be fitted to this chassis. The two four-cylinder models are exactly alike in design, differing only in motor size and power, wheel base, tire size and body capacity.

Refinements in Motor Design.—The 34-horsepower motor has cylinders 4 1-2 inches "square." As used in 1908, it delivered 32 horsepower, but increasing the size of the valves and the carbureter capacity justified a higher rating. As in preceding models, the most distinctive feature of the motor is the offset crankshaft. This proved in practice an even greater advantage than was expected. The flexibility and power at low motor speeds are further augmented by an increase of twenty-six pounds in the weight of the flywheel rim. The makers claim that it is now possible to throttle a four-cylinder Rambler as low as three miles an hour on the high gear. The two-to-one gears have been doubled in width, and the driven gear is now of rawhide; with these improvements and careful machining, the gears are absolutely silent. The crankcase is in one piece, the crankshaft with its assembled bearings being inserted through the rear end. Both the main and the connecting rod bearings are of the marine wedge type, and may be easily adjusted through a hand-hole 8 x 23 inches on the right side of the crankcase. It is thus no longer necessary to remove the mud apron and the oil pan, and, to still further facilitate adjustment, the front mud guards have been made of the quick-detachable type. The exhaust manifold has been raised to allow easier access to the valve stems and springs and the adjusting nuts. The relief cocks in the cylinders are of a new type. They are, in fact, check valves, which are held closed by springs and by the pressure in the cylinders. The higher the pressure the tighter they become, preventing leaks through wear.

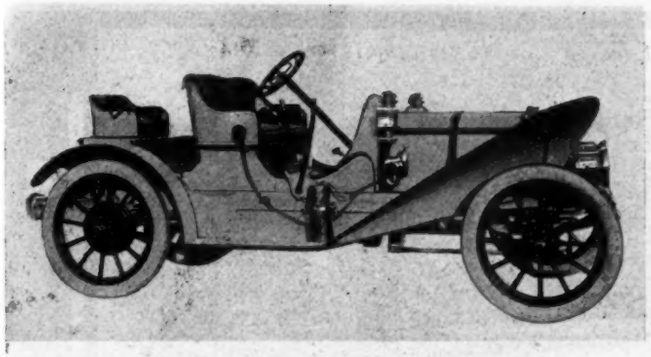
Passing to the ignition system, it will be noticed that the timer has been placed in a higher and more accessible position, and flexible cable is now used to carry the primary as well as the secondary current. The spark plug terminals are of a new and convenient design. The wire ends in a fiber block, which is attached by a bracket to the upper water pipe. A thumb screw locks the bracket in any desired position. From the block a metal strip extends to make contact with the flat metal head of the spark plug. Should missing occur because of soot on the spark plug points, raising the fiber block slightly will form a spark gap between the strip and the plug head, and the missing will be temporarily overcome without changing the plug. When it is desired to remove the plug the fiber block may be raised clear, and the cable need not be disconnected.

The pump is now driven from a straight shaft on the side opposite the camshaft. It is entirely detached from the crankcase, so that if a leak should arise water cannot enter the two-to-one gear housing or the crankcase. The end of the pump shaft is arranged so that a magneto may be coupled on if desired. The standard Bosch high-tension magneto will be carried in stock and furnished when ordered at an extra cost of $150, forming a complete double ignition system. This specification will cause no delay in the filling of orders. The magneto is located at sufficient distance from the crankcase and the oiler to allow easy access for inspection and adjustment, and may also be readily removed.

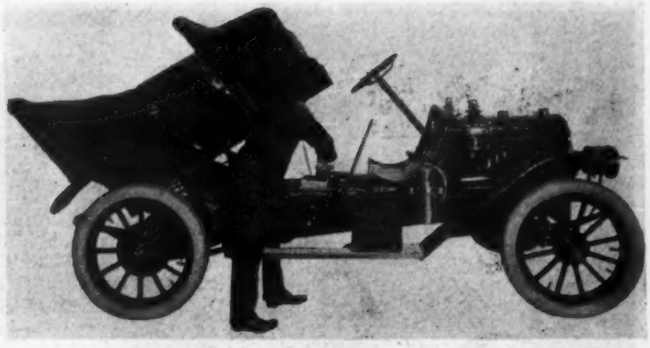
Lubrication is cared for by a mechanical force-feed oiler, of a capacity 50 per cent. greater than that used in 1908. The oiler is also located rather farther back, to permit better access to the magneto. It is placed in an oil tray arranged to catch any overflow, and flying oil from the flywheel and clutch is prevented from spreading by a metal guard.



Mounting of the Rambler New Triple Action Springs.



Rambler Type 44 A-1, Four-cylinder Roadster.



Motor Accessibility on the Two-cylinder Rambler.

Concerning the Transmission.—The inverted cone clutch formerly used has been replaced by the direct thrust type. The cone is made of pressed steel instead of aluminum, thus being less liable to distortion from severe use, and the surface has been increased about 50 per cent. It differs from other clutches principally in this greater surface and in the arrangement to vary the tension of the spring. The adjustment is so easy and so accessible that it can be attended to on the road at any time, thus eliminating any excuse for burning clutch leathers. Studs extending from the inner surface of the cone contain spiral springs placed under the leather to insure gradual engagement. To stop the spinning when the clutch is released, a camel's hair block is placed in the bearing of the releasing arm to give a braking action.

The change-gear remains the same as before, but a slight change has been made in the shifting mechanism. The reverse gear is engaged by bringing the lever directly back of the position for the first speed forward. To prevent an inexperienced operator from going into reverse in attempting to change from first speed to second, a bell crank is so placed on the quadrant as to interfere with the backward movement of the lever into the reverse slot. When it is desired to engage the reverse the crank may be displaced by pressing a button conveniently set in the floor.

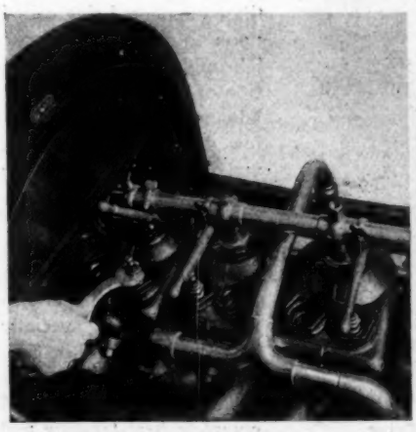
A feature which will be appreciated by owners is the provision for brake adjustment. Both the foot and the lever brakes may be tightened by shortening the rods which connect the pedal and lever to the equalizing shafts. At the front end of these rods are placed larged thumb nuts easily adjustable by hand. It is possible to do this on the road while the car is running. The brakes are of the same size as before, but the leverage has been increased by changing the position of the brake shoe and band operating lever. Formerly the brackets supporting these levers were of such design as to limit their backward movement. The brackets have now been hollowed out, so that when at rest the brake levers stand at an angle of 45 degrees to the rods.

Few Changes in the Running Gear.—The Rambler screw-and-nut steering gear, tested by six years of service, is used again this year. The parts are heavier, and better provision is made to guard against and compensate for wear. Downward thrust is taken up by a ball thrust bearing located at the top of the steering column. Wear in the gear itself is guarded against by the use of a hard bronze nut, instead of babbitt as before. The steering arm is carried well out to the frame, so that the connecting link does not interfere with the mud pan.

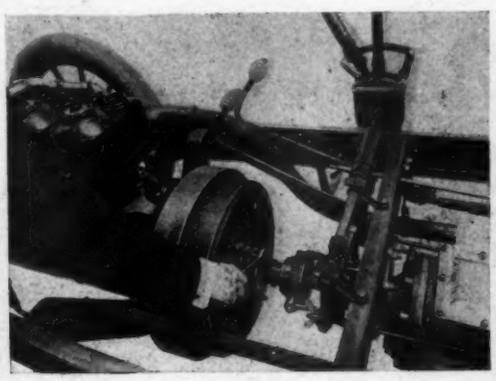
For some time the Rambler company has been trying to obtain a rear spring for the four-cylinder models which would provide as great flexibility as any other type and retain the advantages of low center of gravity and absence of side sway peculiar to the semi-elliptic. The desired qualities have been attained on the new models by springs known as "triple action." Besides the flexibility provided by the auxiliary coils, these springs are unusually long and have all the advantages of the semi-elliptic. They have been thoroughly tested on a number of cars of the 1908 model.

Features of the Two-Cylinder Car.—The Rambler two-cylinder models will consist of a five-passenger touring car and two or three-passenger runabouts, listing at from $1,150 to $1,350. Very little change has been made from former models. The unit power plant, with the change-gear, clutch and flywheel enclosed, is continued in exactly the same form. The body is arranged to tilt upward to give access to all working parts in the motor and transmission. The main crankshaft bearing is of the self-centering type, and adjustment is accomplished by turning in a ring which draws the two halves together in a tapered box.

An unusual feature for a two-cylinder car is the floating type rear axle. The weight of the car is carried on heavy roller bearings, located on the axle tube, the driving shafts being relieved of all weight and serving simply to rotate the wheels. The aluminum rear axle housing formerly used has been replaced by a heavy forged yoke. The clearance of this car is unusually large. The lowest part of the mechanism is the rear sprocket, and as this is located to one side of the center, it clears obstructions which centrally located sprockets would encounter. In addition, the rear wheels are 34 inches in diameter, so that there is a distance of 15 1-4 inches from the ground to the axles. The tires are 34 x 4 inches and the wheelbase 106 inches.



Showing the New Plug Connectors.



Simplicity of the Rambler Clutch Adjustment.

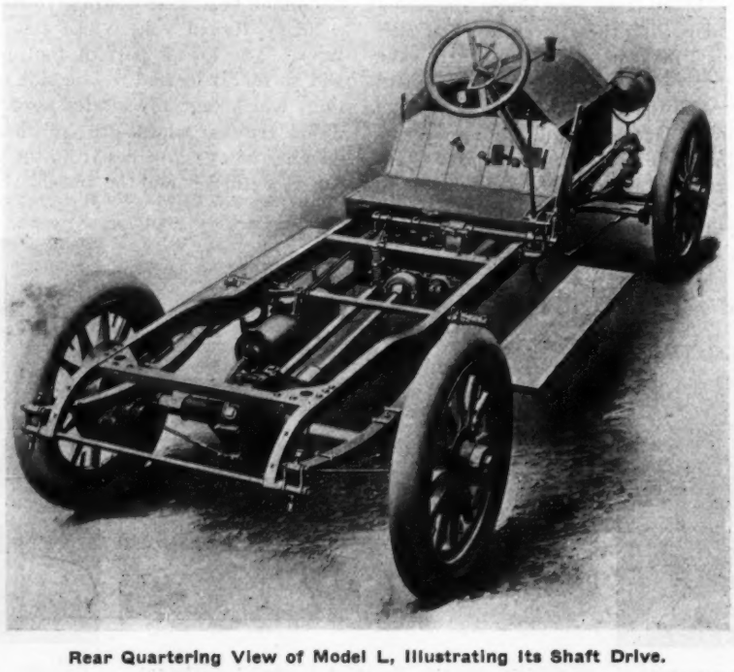
Rambler Main Bearing "Get-at-ability."

Locomobile Shaft-driven Model for 1909

By Charles B. Hayward.

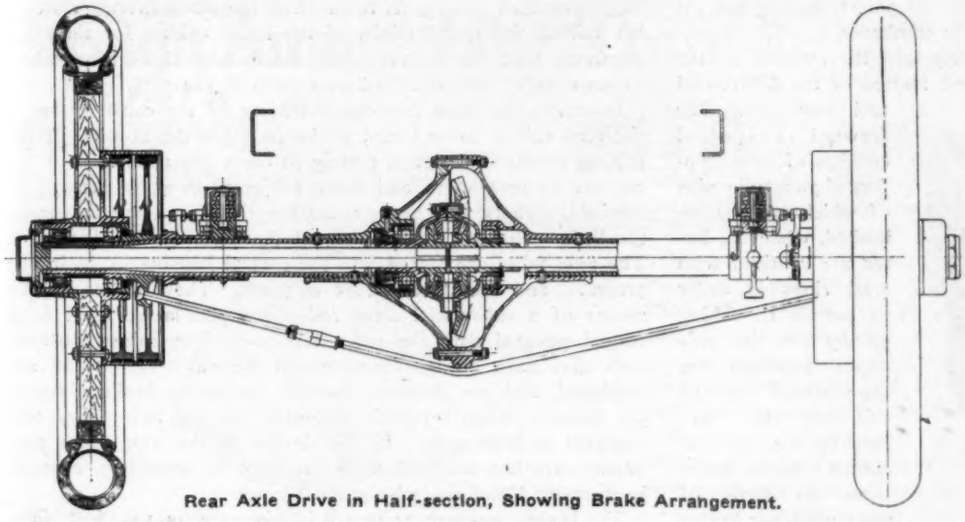
BRIDGEPORT, CONN., Oct. 26.—There will be a shaft driven Locomobile for the 1909 season, and, while this announcement of the builders may come somewhat as a surprise to advocates of the chain drive, of which the Locomobile Company has been a most consistent advocate since the earliest days, it will doubtless prove more of a surprise to learn that Mr. Riker and his staff have been working on the problem of the shaft drive for more than three years past. From the very outset the upholder of the chain type has looked with considerable suspicion upon any construction which must at once bear the load of the vehicle and also act as a driving medium, and it has been with the idea in mind of entirely eliminating any disadvantages arising from the latter that the Locomobile Company has centered its efforts for so long a period upon a shaft-driven model without making it public. In other words, the object has been to evolve a shaft drive that could be regarded as on a par with the side chain and the dead rear axle, where safety and reliability are concerned. This the designers of the Locomobile feel confident that they have achieved in the new Model L, and a review of its specifications as here set forth goes far to confirm it.

Details of the Power Plant.—As is naturally to be expected, the motor is characterized by the numerous details of design and construction that have been worked out by Mr. Riker and his staff on the Locomobile cars in the past seven or eight years, so that there is an utter lack of anything that might be termed radical, or for that matter anything that is really a departure from what has long since come to be recognized as standard practice on this car. The cylinders are of the "T," or outboard valve port type, cast in pairs, with large openings in the heads of the water jackets that are covered with bronze plates. The cylinder castings receive three boring cuts, and are then ground. The cylinder dimensions are 4 1-2 inches square, and the power rating nominally employed to distinguish the car is obtained at a low normal speed and is very conservative, as the motor has shown close to 40 horsepower on long-continued tests, made on an electric dynameter, an installation of several of the latter being used entirely in testing the Locomobile motors in the regular course of manufacture. The valves are oppositely disposed, and are driven from independent camshafts, the inlet shaft also carrying the igniter cams. The latter are made with a tapering face, and the shaft itself is so mounted as to permit of its being shifted longitudinally to advance or retard the ignition timing. Both of the camshafts are made with the cams integral, and are one-piece drop-forgings turned out in the home plant, the Locomobile Company having long been noted for the completeness of its drop-forging equipment. This method is employed for the manufacture of every part to which the process lends itself, ranging from the smallest fittings up to the one-piece I-beam front axles. All drop forgings are subjected to treatment.



Rear Quartering View of Model L, Illustrating Its Shaft Drive.

As has been the case for a number of years past, manganese bronze is still retained as material for the crankcase, the supporting arms for the motor being cast integral. The oil-pan is of aluminum, as is also the housing for the timing gears, neither of these members being called upon to sustain any load. Throughout the construction of the motor the most advanced practice is followed to insure accuracy and interchangeability, the cylinder, pistons, rings, crankshaft and camshaft all being ground to micrometer gauge, while such pieces as the crankshaft are all specially heat-treated, the Locomobile plant having a particularly elaborate and complete heat-treating and



Rear Axle Drive in Half-section, Showing Brake Arrangement.

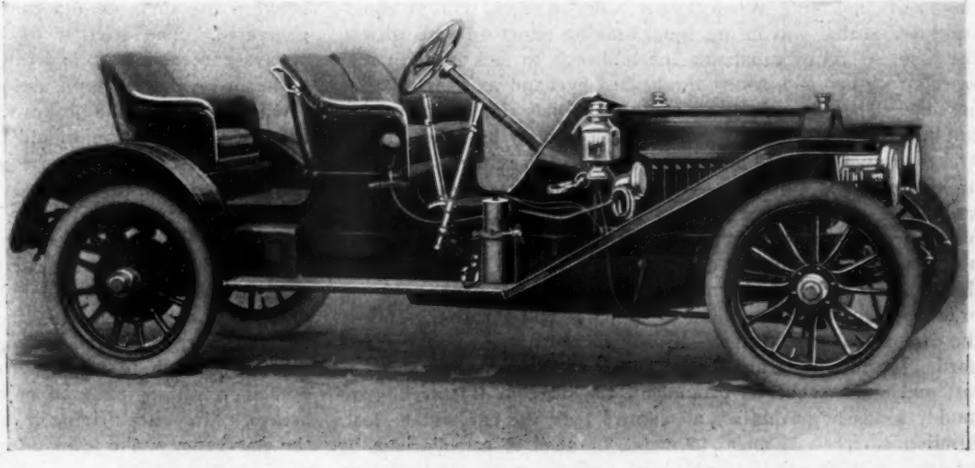
hardening department in connection with its drop-forging plant.

About the Motor's Accessories.—As has come to be recognized as the best standard practice in this respect, the oiling equipment of the motor has been made practically integral with the latter on the new Model "L." A mechanical force-feed oiler, having three direct leads to the main bearings, is situated at the rear of the motor, almost under the footboard, and is gear-driven from that end of the exhaust camshaft, the drive all being protected by an aluminum oil-tight housing. To facilitate the distribution of the oil, the crankshaft is drilled, while a hand pump on the dash is employed to suppplement the crank-case supply for splash lubrication whenever necessary. But one of the oil feeds is carried through a neat and very small sight glass on the dash, thus ridding the latter of what has long been regarded as an undesirable encumbrance.

The carbureter is of a special type that has been developed by the designers of the Locomobile during the past five or six years, and which for the coming season has undergone one or two changes. Chief among these is the adoption of water-jacketing, hot water being tapped from the top of the jacket of the rear twin-cylinder casting, and led between the latter and the forward pair to the carbureter jacket, the discharge from this being returned to the bottom of the radiator. Liberal sized copper tubing has been adopted for this purpose, and no flexible joints have been found necessary. Shut-off cocks are provided both on the intake and outlet to provide for regulation of the hot-water flow. Another entirely new feature of this carbureter is the conical tapered spring auxiliary air valve. This spring is carefully wound to a very closely predetermined tension, and is vertically placed directly above the throttle, which is of the piston type. An increase in suction above that normally taken care of by the main air inlet causes this spring to distend, thus permitting additional air to enter through the spaces between its coils. The piston throttle in question is controlled from one end by the usual hand lever on the steering wheel, while from the other it is regulated by a centrifugal governor incorporated in the exhaust camshaft-driven gear. This governor permits the motor to maintain any speed up to the point of throttle opening allowed for by the hand lever, while the accelerator pedal cuts out the governor entirely. The low-tension magneto of Mr. Riker's design, which has been a distinguishing feature of the Locomobile since 1905, is continued without any change whatever from the 1908 model, this also being the case where the igniter equipment is concerned, as this part of the car has been developed to a point which leaves nothing to be desired. A feature worthy of mention in this connection is the fact that the iridium steel contact points employed are now welded to their blocks, making them practically integral with the latter. Cooling is provided for by a centrifugal pump circulating the water through the honeycomb type of radiator that has long been a familiar Locomobile feature. This is supplemented by a belt-driven aluminum fan running on ball bearings, and for which an eccentric tightening adjustment is provided. Union connections are employed on the radiator, both top and bottom, and do away with the necessity of breaking hose connections when necessary to dismount any part of the cooling system. Both the throttle and spark control are effected through a screw and nut movement, instead of the bevel gears ordinarily employed, this making a considerable saving in space.

The starting crank spring, instead of being carried forward as formerly has been placed farther back, and is now completely housed in, giving this part a much neater appearance and protecting it from dirt.

Features of the Transmission.—The first step in the transmission of the power consists of the standard type of leather-faced cone-clutch, which, however, is so mounted as to be removable without altering the tension of its engaging spring, or, in fact, without disturbing any of its related parts. Flat springs are employed under the clutch leather, causing the clutch to engage smoothly and without jerk. No universal has been found necessary between the clutch and the gear-set, the latter being placed about in the same position in the car, as was the case when it was chain-driven. The gear-set is of the sliding type, providing four forward speeds, with but two, instead of the usual three, sliding members. Both shafts are mounted on imported annular ball bearings, and the entire gear shifting mechanism is enclosed in the same housing with the driving gears. The use of but two sliding members to effect the gear changes permits of the use of a much simpler sector. Direct drive is on the fourth speed. The housing of the gear-set is of



Attractive Lines of the "Thirty" Locomobile Roadster for the Coming Season.

manganese bronze, with an aluminum oil pan, following out the same construction as characterizes the crankcase.

Drop-forgings enter almost entirely into the makeup of the shaft drive, and are also a prominent feature of the differential and rear axle. The forward universal consists of two drop-forged yokes, the pins of which are bronze-bushed, while the latter are clamped with steel rings in order to permit of taking up any wear that may occur, although the experimental cars of this type that have been on the road for almost 10,000 miles show no signs of wear whatever in this essential. At the rear end of the shaft there is a combined universal and telescope joint, consisting of an extended drop-forged yoke in which a substantial pin is free to move longitudinally on rollers, the latter being hardened and ground, as is the case with all load-carrying parts. This yoke of the universal joint is in one piece, with the shaft carrying the driving bevel, and is supported on an annular ball bearing besides carrying a special thrust bearing of the ball type, which is placed directly behind the universal. There are several features of interest in connection with the use of the annular ball bearings on the Locomobile, a great deal of care having been taken to mount them exactly in accordance with the maker's specifications. For instance, the races of the forward bearings in the gear-set are rigidly held, while the after one is allowed to float, thus permitting the bearing to center itself accurately. This is also true of the ball bearings used on the driving shaft of the live axle. All are of unusually large sizes for the loads to be carried, providing a very high factor of safety where these important essentials are concerned. A ball thrust bearing is placed on each side of the differential and annular ball bearings are used for carrying the rear wheels. The driving shafts are one-piece drop-forgings, and are made integral, with heavy flanges on their outer ends from which the wheel-driving clutches are milled, the specifications of the latter calling for their engagement with the corresponding member on the driving wheel to .0001 inch. The standard gear ratio is 3.24 to 1.

Brakes of the "Thirty" Locomobile.

Doubtless the most interesting feature of the construction of the rear axle is to be found in the fact that the housing of the driving shafts is designed merely to carry the dead load of the car and its passengers, and is not subjected to either braking or torsional strains, this being a feature that has come in for all too little attention on a great many American shaft-driven cars. The axle tubes are seated into the central housing by hydraulic pressure, and are then riveted in place. They are braced by means of a substantial strut rod made with a ball seat head forged integral with the rod. The same drop-forged distance rods that have always characterized the chain-driven car are employed, and are designed to take the entire braking strain, the springs being revolubly mounted on the axle tubes and shackled at both ends. In the design of the axle tubes particular care has been taken to eliminate all shoulders, changes in diameter being made by gradual taper.

The brakes measure 14 inches in diameter by 1 1-2-inch face, and, instead of being mounted concentrically, are placed side by side in a large drum housed in by a plate carried on the distance rod. Small yoke equalizers are employed on both the emergency and running brakes, thus dispensing with cables. The brakes are cam-operated, the shafts being concentric, and are lubricated by a compression grease cup, as is the case with every other moving part of the car outside of the motor and gear-set, no less than 28 of these cups being provided on such parts as the spring shackles, steering knuckles and the like. Further evidences of the painstaking care used to provide proper lubrication is to be found in the fact that the spring leaves are all graphited before assembling. The rear springs measure 48 inches by 1 3-4 inches, while the forward ones are 36 inches long, of the same width. In drop-forging the saddles for the former, an extension has been placed on them to provide a lifting point for the jack—an addition that has been found very convenient. The steering gear is of the worm type, a full worm wheel being employed instead of a sector, thus providing a means of taking up wear by bringing an entirely new gear face into contact. The front wheels are carried on Timken roller bearings; the wheel base is 120 inches and the tread 54 inches, tire equipment consisting of 34 by 4-inch front and 34 by 4 1-2-inch rear, the make being optional. The new model will be listed at $3,500.

THE IMPORTANCE OF HAVING GOOD BRAKES

By ARTHUR H. DENISON.

It is never worth while going out with a car unless the brakes can be depended on. Accidents are costly, as well as dangerour to life and limb. When the car is not equipped with an equalizing device that will insure equal braking effort on both wheels, the best method of equalizing the brakes is to jack up both rear wheels together and adjust the brakes by hand as near alike as possible. Then have someone apply the pedals similar to running conditions and try to turn the wheels separately by hand. If the brakes are not adjusted alike it is easy to adjust either so that the braking effort is uniform. Also see that the brakes do not drag and waste power. Some brakes are intended to be lubricated, others are useless if oil gets on the friction surfaces. When this happens the best thing to do is to squirt a little gasoline on the drum. This will cut the oil and restore the efficiency. If one brake is adjusted tighter than the other it will throw the end of the car on that side around. Brakes should never be applied too hard. If the wheels are locked, much of the retarding effort is lost and much rubber is ground off the tires, or if traveling on muddy roads or pavements all control over the car will be lost. Friction surfaces of metal to metal, or steel to camel's hair or asbestos, will give little trouble with ordinary care. If leather is used, its life will be prolonged by releasing the brakes for an instant while in use. This will allow a current of air to pass between the surfaces and carry away a great deal of the heat generated. The friction of the brake leather on the drum always generates heat, and the leather may be heated enough to be burnt or charred until useless.

On long grades the brakes should not be depended on to hold the car. The ignition should be cut out, and, depending on the length and steepness of the grade, a suitable gear should be meshed and the car allowed to coast under compression, the brakes supplying any further retarding effort necessary. The writer, handling a 50-horsepower car that loaded weighed over 5,000 lbs., has brought the car to almost a complete stop from a speed of about 15 miles per hour on a 20 per cent. grade, by dropping the clutch in with the engine dead, first speed in mesh, and the energy required to bring the motor to the speed of the car was enough to bring it to almost a dead stop. This is a greater retarding effort than could be obtained by the use of brakes. Motorists driving in a hilly country should *never* have the emergency brake lever *interconnected* with the clutch, as this prevents the use of a very efficient brake.

THERE are many women, and men, too, who visit Paris, take a turn or two in the Bois, a few rides out over the execrable suburban *pavé* to Versailles, Saint Germain, and Fontainebleu, and that is all. These suburban Paris sights many people think they must enjoy and take in because they are classic, and because they have been told that the roads leading thereto are the same over which royalties one day rolled in bone-shaking state coaches, and did not mind in the least because they never even suspicioned the advent of the automobile. The horseless carriage demands something more than Louis Quatorze *pavé* in order to travel in comfort. It is these folk who do their automobiling around Paris who go home and tell of the "lovely time" they had "touring in France." Some may even get so far away from the capital as to spend three or four days in what has come to be familiarly known as "the châuteau country," dividing their time between the big hotels of Orleans, Tours and Nantes, and the show châteaux.

One instinctively puts France first where automobile touring is concerned, for where one woman is seen on the road in other countries there are hundreds in the land of good cooks. The round of show places and big hotels is enjoyable enough in France, at least more so than elsewhere, but the open road stands for much more. It means the long run across country leaving some little country hotel early in the morning, so early, sometimes, that even the *garcon d'ecurie* is not yet about, and one is obliged to open the *grande porte* of the courtyard one's self in order to get out into the open. This presumes, of course, that one has taken the precaution to pay his reckoning the evening before, and, being in a considerate mood for the feelings of other people, takes care also to push his automobile into the street and start it there rather than fill the small courtyard with smoke and noise and the ire of the sleepy inmates of the house. It is these little courtesies that smooth the way of the automobilist, but not everyone thinks of them at the right time, least of all, milady, who, for a fact, often thinks she is doing everybody about the place a favor by condescending to have lodged in such a humble establishment, where she has to retire by the light of a candle, as she most likely will have done if she is really touring and not flying willy nilly, humming-bird fashion, from one electric lighted resort to another.

The knobbly *pavé* of the village is soon over and your automobile swishes along the smooth white road between dewy fields where the industrious peasant—invariably an early riser in France—is already at work. The sole occupants of the road at this time, other than yourself, are great farm horses with their clumsy carts and drowsy drivers, and they, too frequently—in France as elsewhere, alas!—on the wrong side of the road.

One should cultivate the habit of the early start, perhaps the most trying of all automobile habits for womankind. One soon learns the wisdom of it, however. If you are going to have trouble with your machine en route, it will come early in the day, and then you will have some chance of getting over it before night.

Breakfast in bed—even a continental breakfast—followed by a dawdling toilette often finds you at night with a lame and limping automobile, and you, like the foolish virgins, may be forced to remain without the gates with no oil in your lamps. An hour or so of this early morning run and then comes the stop at some little wayside café for an unconventional breakfast of a cup of coffee and a roll, and as you drink it in a little vine-covered arbor, or on some hillside terrace, you will not regret the lost breakfast in bed, with the almost invariably bad hotel *café-au-lait—a rechauffée,* simply of the coffee of the night before.

Many tour thousands of European kilometers without maps, without once slackening speed at any of the excellent and obvious road signs scattered up and down the continent, and are proud of it. Their unhandy method is to harry the good-natured natives along the road, but then one only gets dubious information at best, for the native himself usually doesn't own an automobile and his own radius of action is always very limited, and his knowledge of roads and routes likewise. A conductor of an automobile such as this eventually loses his temper and everybody suffers.

Ideal Foreign Tour Not a Dress Parade.

The ideal tour isn't a dress parade, and it should not be made to include the resorts of the big hotels whose *salons* are the showrooms of the *couturiers* and *modistes* of Paris, London and New York. If the glamour of the grand hotel tour is too strong to be resisted, why go in a big limousine, top-heavy with luggage, trunks and hat boxes, if you will, but be consistent, at least, and don't try to mix vagabondage and super-luxurious travel. The woman who is always talking about how she "loves those quaint little country places where one doesn't have to dress, you know," has invariably excellent reasons as to why she is never found at any of them, and has her name cabled frequently to her home paper as having arrived at the Grand Hotel this or that at Trouville, Aix-les-Bains, Cadennabia or Biarritz. If by any chance one of these flighty, unknowing persons is ever induced to sample the delights of the simple country inn, her chagrin and weariness are painful to observe.

It is not necessary for a woman to always have by her a trunk filled with what she sometimes calls Monte Carlo clothes in the hope that she will be able to induce her husband to pass that way. It may be well to remark right here that no Mediterranean Winter resort has a climate which warrants the wearing of indiscriminately thin dresses.

The modest suit case will not debar one from the enjoyment of Europe's great pleasure resorts. It is just as easy to enter the *Salles des Jeux* at Monte Carlo, and amuse one's self in losing or winning a few or many five franc pieces, or "louis" for that matter, and one may lunch at Ciro's as much at ease in the simplest traveling dress as in the latest Parisian confection, though, perhaps indeed they will not be so conspicuous. It is true that on entering the Casino at Monte Carlo the woman automobilist, who is still shrouded in a veil, will be asked to take it off before entering the *salles*—this for some occult reason known only to the administration.

You may even rub shoulders with Kings Edward and Alphonse at Biarritz in the same democratic garb in which you do your automobiling, as you "five o'clock" on the hotel terrace. They will, most likely, be dressed in the same sensible fashion.

If one should foolishly lumber up their automobile with much baggage, not many, even with the best intentions in the world, will have enough energy left to make any radical change in their dress when finally they reach the night's stopping place.

On this basis one's preparations soon dwindle down to a change of stock, a hasty brushing off of dust, and a generous

polishing of hands and face so that when the big bell in the courtyard sounds for dinner, one descends to the *salle à manger* much too healthily fatigued and hungry to even care to explain why she hasn't "dressed for dinner."

Don't Be a Fault-Finder; It Doesn't Pay.

It will avail nothing to bolt into the English country inn, French hotel, or Italian albergo and adopt an air of criticism the first thing, as if you were about to plan the reconstruction of the establishment according to your own preconceived ideas. One only gets disliked for this and accomplishes nothing except to upset the ménage and add to discomforts already existing.

Don't try to have a course dinner served to you all at once, because you can't eat meat without vegetables, nor demand *café-au-lait* with the same repast unless you are prepared to astonish the natives and pay, say, a franc and a quarter extra for each person. All these things only bewilder the *garçon,* excite the *chef,* and spoil what would otherwise have been a good dinner.

What is the use of calling the *bonne* to account if there is a bit of fluff on your bedroom floor so long as the beds are clean and good, as will most always be found to be the case even in the most modest of European hotels.

Make up your mind before leaving home to do without bathtubs. In England the exaggerated flat tin dish that answers to the same name as our best porcelain in America is no better suited to its purpose than the more limited accommodation one usually finds in France and Germany and Italy. The dust of the roads comes off no better in one than the other. The only way to get it off is to lie down and soak it off, and there are very few opportunities for that in Europe outside of the great capitals and the frankly avowed resorts with a stranger clientèle.

The substitute is the jugs of water, which, on account of their diminutive size, are brought by many journeys of the willing *bonne* or *madchen,* or, in France, as is most frequently the case, the service will be performed by a *garçon*—a man in other words, though do not let this shock your womanly sensibilities. It is the *garçon,* a man of all work about the house, that in France, more often than not, performs the functions in the small hotel in the small town which are usually delegated to a *femme de chambre* elsewhere.

Hunting for Hotels with Bathtubs.

There is a largely increasing class of travelers wandering up and down Europe, who spend a good part of their time on a still hunt for hotels with bathtubs and "hot and cold water laid on," as the English have it. This brings dismay to the ordinary European hotel-keeper, to whom a single *salle de bain,* accompanying a score or two of sleeping rooms, is already considered as the acme of an unnecessary and luxurious appointment, and one on which he is loth to spend more money to provide a further installation. Therefore, the private bath is practically non-existant off the beaten tracks, and the common public affair, even, is a great rarity.

The wail of these good travelers who would demand a bathroom for their own use if they were in darkest Africa goes up continually in a loudly increasing scale from London to Cairo and from Paris to Rome. It forms one of the principal topics of conversation, where women tourists mostly congregate; this, regardless of the fact that with many must still linger the remembrance of the good old-fashioned Saturday night scrub which they took in the family wash-tub before the kitchen fire. Porcelain tubs and hot and cold water led up thereto in nickeled piping didn't arrive with us at the same moment that the Mayflower set down its array of ancestors on Plymouth Rock.

When Women Are in the Party.

The very fact that an automobile touring party counts women among its members is often an excuse for the European hotel patron to press upon his guests the use of small tables in the dining room (at fifty centimes or a franc extra for the repast and *vin non compris*) or an even *salle particulière,* as being more exclusive than the ordinary table d'hôte, and, therefore, what you are looking for. You are probably not looking for this sort of thing at all, but he thinks you are. Why the automobilist should be put into a class by himself is not quite clear, and should be discouraged by the woman automobilist who is largely responsible for this invidious distinction. It's more expensive and less amusing from every viewpoint.

The day when automobiling can properly be considered a society function or the *jeu* of millionaires and heiresses has happily passed, so don't hesitate to take your seat at table d'hôte, for the dinner is just the same as would be served at small tables and the price less. The establishment could not vary its menu in many cases if it would, save to add a tough *bifteck* or an *omelette au jambon* always given *"les étrangers"* if they will stand for it, even if you are, as will often happen in the country town, the only woman present. At the long table in the center of the *salle à manger* you will not be annoyed by unduly inquisitive stares or comments on the part of the other diners, not half so much as will be your fate if you sit apart. The provincial European, the Frenchman in particular, especially when occupied with his dinner, preserves an almost Oriental oblivion to the presence or even existence of woman.

It may be that in your tour across France en automobile, when you have reached the little town where you have elected to pass the night, it happens to be the eve of market day, and as you drive noisely into the courtyard of the principal hotel you find it crowded with farmers' carts and wagons of all ranks of distinction and size. What difference ought it make to you if you are put to sleep in the only vacant rooms which remain, those running along one side of the courtyard over the stable, and to which you mount by an outside stairway and an open air gallery? It's all in one's book of experience, and so long as the rooms are clean and the dinner good (which you will eat in company with the prosperous neighboring country folk there assembled) you will be better content when it is all over than you most likely would have been had you kept on to some big town and been served imitation Parisian fare.

Another Leaf in Experience's Book.

The next night, perhaps (and here's another leaf in the book of experience which you will reread with pleasure at some future time) you will find yourself housed in some aristocratic old hostelry which claims the local noblesse for its clientèle, as it did in the old posting days of Le Grand Monarque. Here you may sleep in a princely bed of inlaid woods, draped with silken hangings. This thing may happen on anybody's "little tour in France," and they, and others, not far different, are what make the charm of French travel. One of the greatest of these is the thing that one falls upon unexpectedly, a quaint inn, a remarkably good dinner, or a bit of local color that looks as though it might be a part of a costume novel.

The automobile tour demands that one and all who make the party should preserve their equanimity; the troubles of the road only serve to accentuate one's pleasurable experiences, and, after all, those are the things which will be most deeply etched on one's consciousness. Troubles are more readily forgotten than pleasures. Women are too prone to think that their way is only smoother for them by the lavish expenditure of money on the part of their male relatives. Something besides money talks, fortunately, when touring in France.

Little politenesses count for much among the older nations, often for quite as much as the indiscriminate throwing around of coin, though it may be difficult to convince some of this. The average person abroad who caters for travelers is not nearly so grasping, if approached in the right way, as is commonly supposed. So scatter a few smiles and appreciative words along with your louis, francs and sous.

Always shake hands with the French country hotel landlord on leaving if you have stayed longer than a single meal (never this thing in England; they would have a very poor opinion of you if you did it). Nothing pleases the patron of the small French hotel so much as this little attention—and you leave behind the verdict, *"Les dames Americaines sont toujours gentilles."*

VANGUARD OF GRAND PRIZE DRIVERS DUE THIS WEEK

WITH the Vanderbilt race over, the scene of 1908's great Autumn road racing campaign shifts to Savannah, where on Thanksgiving Day will be run the international Grand Prize contest for the Automobile Club of America's gold cup, with a light car race the day before by way of a curtain raiser.

The first of the foreign drivers arrived Tuesday, they being Cagno and Piacenza, of the Itala team. Fournier, the other member of the trio, will not reach here probably until next week. Nazzaro and Wagner, of the Fiat team, are on the *Lorraine*, due on Saturday, on which Hautvest and Rigal, of the Clement-Bayard, and Duray, of the De Dietrich, are also reported to have sailed. Szisz, the Renault pilot, will sail this Saturday on the *Touraine*.

The entry list for the light car race is growing rapidly and on Tuesday had reached 21. Two more Buicks have been nominated, raising that factory's string of candidates to four. Late entries include three Oldsmobiles. Their nomination by the Olds Motor Works is noteworthy in that it marks a re-entry of Oldsmobile cars into the racing game. Besides this, this race will be the first competitive, and, in fact, public demonstration of the new $1,200 cars this company is to put on the market. They will have 3 3-4-inch cylinders. It is expected that William Folberth will be the pilot of one of them.

Entries for the Grand Prize and light car races will close finally next Monday. The headquarters of the club's contest committee will be transferred to Savannah, October 15, when Chairman Morrell will take up the preliminary local preparations for the races. N. H. Van Sicklen, of Chicago, who was prominent in the management of the March races, will go to Savannah next week to again assist the local clubmen.

QUAKERITES HAVE GASOLINE-ELECTRIC STOP-WORK TEST

PHILADELPHIA, Oct. 26.—Thursday afternoon last there was quite a little flurry of excitement all along "Gasoline Row" over an impromptu contest between an electric and a gasoline —both of the Studebaker brand—which was pulled off to decide a heated discussion as to the relative merits of the two powers in short-stop work in big cities.

It was agreed to make up a list of 25 calls, with instructions to each driver to make one-minute stops at each place, and shutting off and starting up the power at each stop; one driver to begin at the top of the list and the other at the bottom. The electric bunch, just to prove that they had no fear as to the outcome, put a lady, Miss Laura Duval, up as driver, while the big seven-passenger gasoline car was handled by Tom Middleton. The latter was off like a flash when the word was given at 2 o'clock sharp, while Miss Duval proceeded more leisurely down Broad street on her mission. There was a wait of a few minutes over an hour when the electric was sighted homeward bound. Miss Duval drew up at the curb at exactly 3.10, while it was a trifle over ten minutes later when Middleton brought the big gasoline to a stop. "Tom" was hot and flustered-looking after "cranking up" 25 times, while Miss Duval finished as cool-looking as a ripe peach in a refrigerator.

Besides the time gained in starting, Miss Duval said she had lost little time in threading the maze of traffic on Chestnut street, her little car enabling her to worm in and out and around standing carriages, wagons, and trolley cars, while the big car was often held up until an opening was made by the starting of the car, wagon, or other obstacle. And yet, despite the "I-told-you-so's" of the electric enthusiasts, the gasoline didn't seem to be convinced.

MARYLAND'S AUTO MEASURE READY FOR LEGISLATORS

BALTIMORE, Oct. 24.—A bill to be presented to the next Legislature has been framed by the automobile commission of this State which will bring in $75,000 a year for use in creating and maintaining good roads, in addition to the $5,000,000 loan which was passed by the last General Assembly. The plan of the commission is to tax cars according to horsepower, the rate being from $10 to $25. Two thousand high-grade cars paying the maximum of $25 a year would make $50,000.

There are altogether 5,500 cars throughout Maryland and the commission says the amount realized in taxes on the remaining cars would make up the other $25,000. This amount would be used in opening up and maintaining improved highways, and this plan, the commission figures, would encourage more people to buy autos, with the result that the number of machines would be vastly increased. The present auto tax is $3 and is perpetual. The commission will recommend in its bill a liberal but not reckless speed law, and will also insist upon chauffeurs being licensed.

DISCRIMINATES AGAINST SMALL CAR OWNER.

BOSTON, Oct. 26.—The Metropolitan Park Commission, which controls most of the parkway approaches into Boston, and which last spring barred from its roads all sorts of tire chains, studs, burrs, and other metallic anti-skidding devices, has announced a change of the rule to go into effect on November 3. There were loud protests from autoists when the rule was put into effect, and as a result the commission watched very carefully its operation. As a result it has decided that after November 3 armored tires will not be prohibited, but that the rule against tire chains shall be enforced and also that the use of ropes of metal or other material on the wheels shall be under the ban. It is not admitted that armored tires do not wear the roads, but that they wear less than chains or ropes.

BALTIMORE WILL HAVE A HILL CLIMB.

BALTIMORE, MD., Oct. 24.—The Automobile Club of Maryland, through its committee on contests and exhibitions, has formulated plans for a hill climb in compliance with A. A. A. rules. The time set for the contest will be either on or within a few days of Thanksgiving Day. Dr. H. M. Rowe, president of the club, has offered a president's cup and Thomas G. Young has also donated a trophy to be given to the winner.

FORT GEORGE HILL CLIMB AGAIN POSTPONED.

Another postponement of the Fort George hill climb, scheduled for Election Day, has taken place. It was found that the competing cars would pass a polling station and possibly interfere with the rights of the voters.

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AMERICAN CAR AND AMERICAN DRIVER.

Differences of opinion may have existed as to the worth of the rules to the industry itself, not a few of the cars engaged may have been two-year-olds and constructed for speed solely, and the field may not have classed as high internationally as those of previous races, but the fact stands out clear and distinct that an American car, made entirely of American materials, and driven by an American, convincingly won the fourth contest for the Vanderbilt Cup, a trophy that now stands by itself in the estimation of automobile owners and makers.

All comes to him who waits—and works while he waits, so that he may be prepared for that which he waits when it arrives. This applies to the company which produces the Locomobile, for it built two superb racing crafts for the 1906 Cup race. One of these was used, and made the fastest lap of the day, but an insufficient practice period failed to disclose minor defects that betrayed themselves in the race itself.

Nevertheless, the designer, and others who had opportunity of obtaining exact knowledge, believed that the two cars were equal in speed to any ever built here or abroad. Naturally, the maker wanted further to utilize the results of his skill. Unfortunately, there was no race in 1907, owing to inability to secure a properly guarded course. (How can we obtain one in the vicinity of the metropolis, unless an iron fence, spike-topped, be stretched around it?) It is now an admitted fact that the 1908 rules, at variance with the international regulations, proved detrimental in assembling a more international entry. At the same time, though the French Grand Prix cars had lesser bore, their makers had retained as much horsepower as before by the simple expedient of lengthening the stroke, for there was no maximum weight restriction.

If the big club in New York City had not in the struggle for the retention of its "foreign relations" forced the European clubs to observe scrupulously the Ostend agreement, it is a certainty that the bore difference would not have kept the Grand Prix cars out of this year's Vanderbilt. However, that is an old story, the sequel of which is scheduled for Savannah on Thanksgiving Day.

Hence again to the Vanderbilt. The American winner met three Germans and two French cars of unlimited bore and stroke, and trounced them aplenty. And right here it should be said that the single Italian participant, with its lesser bore and stroke, made a consistent showing for which it should receive a goodly amount of credit, though it should be mentioned in the same breath that an American driver was at its wheel.

The intractable American crowd surging upon the course as soon as the American-Italian duel had terminated, prevented other cars from finishing, though it is good figuring that No. 1 Locomobile was entitled to third place in front of a Mercedes, behind which another American, a Thomas, was progressing homeward.

In the showing of the Chadwick six-cylinder there is something more in which America can take additional pride, for it led three laps and lost its grip of the situation, not owing to troubles of its stock engine, but because of ignition difficulties. Its engine meets international conditions, and 'tis said may participate at Savannah, with the Grand Prix invaders.

It has been one of the faults of American makers to delay preparations for racing until the eleventh hour, and then expect to hold their own with the creations of European manufacturers who have carefully planned a year ahead and left undone nothing which might seem to insure success. It is pretty good guessing, however, that this time the Locomobile candidates were ready and waiting for the starter's gun, even though there was some uncertainty as to the men who might be placed at the steering wheel. And therein lies another reason why we in America have been sadly at a disadvantage in high-speed competition. Our drivers have not had sufficient opportunity to try out their cars in such manner as their French and Italian rivals, who have miles of practically untenanted roads where speed is reasonably interpreted.

The building of the Long Island Motor Parkway unquestionably will greatly aid in lessening this handicap in the future, for certainly it will provide a place for trying out a car to its full capacity.

All in all, the 1908 Vanderbilt race, despite its deficiencies, is an event calling for American enthusiasm and American confidence in future international competition, the life of which may not be very extended in automobiling, owing to the inevitable growing unproductiveness of the American market for the foreign makers, who will not race here when they cannot sell here.

INTEREST naturally attaches to the mechanical details of the winning car, for in these days of strenuous competition, when the loss of but a minute or two means dropping back into place, instead of achieving the coveted first, the specifications of the design and construction that withstood the gruelling test without a falter and came through with flying colors are matters of import. Robertson's Locomobile, which ran as No. 16, and Florida's No. 1 Locomobile are the twin cars designed and built especially for the Vanderbilt Cup race of 1906, and with the exception of a few minor changes, such as the substitution of a selectively operated gear-set in place of the progressive type formerly employed, they have not been altered.

In the light of the present tendency to limit motor dimensions, the Locomobile's cylinder dimensions of 7 1-4-inch stroke by 6-inch bore appears very large, but the object under the rules formerly prevailing was to construct a motor of the maximum size, consistent with the minimum weight limit of 1,000 kilos. The cylinders are cast in pairs with the water-jackets integral, but the latter are largely cut away, the openings being covered with light plates, to save weight. The inlet valve is placed in the head and the exhaust on the side, both being operated from the same camshaft.

For ignition, a special low-tension magneto, made from specifications by Mr. Riker, the designer of the car, is relied upon entirely, the ignitors being exactly the same as the stock Locomobiles, as, in fact, is the case with many of the other features of the car. The clutch is of the conical type with the usual leather face and is held in place by six dowels when home. The remainder of the transmission is composed of a three-speed selectively operated transmission and double chain drive. Both front and rear axles are one-piece drop forgings of the I-beam type. The wheelbase is 110 inches.

Interesting Racing Career of the Pilot.

George Robertson, the winner, is a New York boy. In build he is a giant. In age he is not so very far into his "twenties." His first introduction to automobiles came through association in business with his father, who, in the days when the short block on Thirty-eighth street between Broadway and Seventh avenue was New York's "automobile row," established there the "Automobile Exchange." He early acquired a reputation as a bold and rather reckless driver. When he took to racing he was promptly included among the ranks of the daredevils.

He well earned the soubriquet when he was entrusted with the pilotage of the first Apperson Jackrabbit when it was entered for the Vanderbilt Cup race of 1906. His preliminary practice for the elimination trials of that year was a series of sensational drives that got him wide publicity in the newspapers and finally landed him against a telegraph pole with an utterly wrecked machine that robbed the Appersons of their chance for the Vanderbilt Cup of that year or even a place on the American team. His first long distance race was in the second Morris Park 24-hour race of last autumn, in which he alternated with "Al." Poole in driving the Simplex. His mount finished seventh with a score of 696 miles. In April of this year came his first road race, the Briarcliff. In this he had the mount on Andre Massenat's Panhard. Though his car was still running at the finish, it had completed but six laps and was sixteenth in line.

The Jamaica straightaway trials this Spring found him at the wheel of the Fiat, but the sprinting honor of the day went to Kilpatrick and the Hotchkiss. Again in the Lowell road race on Labor Day he was entrusted with the driving of a Fiat, which finished fourth to the Isotta, Locomotive, and Knox.

In the first of this year's Brighton Beach 24-hour races, Robertson shifted again to the Simplex, and, alternating at the wheel with Lescault, finished fifth, after having led in record time during the third, fourth, fifth, and sixth hours.

This ended Robertson's apprenticeship of wholesome defeats, which had taught him conservatism and caution and that the race is not always to the swift. His victory in the Simplex in the second Brighton Beach race in track record time, and his triumph in the Founders' Week 200-mile race at Philadelphia, both of which occurred this month, are recent history and formed brilliant tryouts for his final winning of the classic Vanderbilt.

Robertson's stop on the last lap had much of the sensational about it. It happened at a series of sharp turns near Bethpage concealed by woods, where the only warning was the noise of the racer. The Locomobile swung around one of these turns at top speed, skidded and turned completely around, ripping off the tire. Robertson won the admiration of the crowd by his coolness in the emergency. He took but 2 min. 10 sec. to put on a new one.

Trade Camps on the Course.—There were several noteworthy trade camps along the course. The Maxwell-Briscoe Motor Car Company and the White Company, with Benjamin Briscoe and George W. Bennett playing the part of head hosts, had big parking spaces, where they hospitably entertained the users of their cars. Mr. Briscoe also made the occasion a veritable reunion of Maxwell agents. The camp was in telephonic communication with the grandstand, so that all hands were informed of the progress of the race. The White people paid particular attention to the entertainment of newspaper men. In fact, that brought over from Philadelphia the "Shock Absorbers," an organization of automobile journalists, and kept them over night in its tent.

The Matheson Automobile Company, the American Locomobile Company, and the Peerless Motor Car Company were among the other prominent makers to establish parking spaces along the course.

Isaac H. Cocks established a parking space as a charity enterprise and netted thereby $450 for the Children's Home at Mineola. Scores of farmers reaped a harvest by turning their fields into parking spaces and renting privileges from $5 to $10.

Things in General about the Race

A. A. A. Notables Much in Evidence.—From various parts of the country came directors and officers of the A. A. A., the Racing Board of which practically supplies the Vanderbilt Cup Commission. The list of those present included the following: Robert P. Hooper, president Pennsylvania Motor Federation; Powell Evans, president Automobile Club of Philadelphia; P. D. Folwell, president, and Richard Sellers, Quaker City Motor Club; Edward Kneeland, president Automobile Club of Pittsburg; F. A. Godcharles, Automobile Club of Central Pennsylvania; Oliver A. Quayle, president, and C. D. Hakes, secretary, New York State Automobile Association; F. B. Hower, president Automobile Club of Buffalo; W. L. Brown, ex-president, and Burns L. Smith, Automobile Club of Syracuse; George B. Baird, president Oneonta (N. Y.) Automobile Club; W. W. Brown, president, and Col. W. D. Woolson, Automobile Club of Vermont; Lewis R. Speare, first vice-president A. A. A., Boston; J. P. Coghlin, president Worcester Automobile Club; W. H. Chase, Wachusett Automobile Club, Fitchburg, Mass.; G. H. Gillette, vice-president Automobile Club of Hartford; H. D. Holbrook, president, and G. E. Cole, treasurer, Litchfield County Automobile Club, Torrington, Conn.; Ira M. Cobe, president Chicago Automobile Club; George G. Greenburg, secretary Chicago Motor Club; James T. Drought, secretary Wisconsin State Automobile Association; LeRoy Mark, secretary Automobile Club of Washington, D. C.; W. C. Crosby, president, and H. A. Bonnell, secretary, Associated Automobile Clubs of New Jersey; J. H. Edwards, ex-president Automobile Club of Hudson County, N. J.; F. B. Moore, Automobile Club of Mercer County, Trenton, N. J., and a host of other club members.

Difficulties of Guarding a Metropolitan Cup Course.—A New York crowd has no reverence for a mere show of authority, as was evidenced by the actions of the horde in the vicinity of the grandstand. Here the eager seekers for free vantage spots easily and without ceremony scaled the much touted wire barrier that was to afford a protected track. Not backed up by an army of guards, this fence might as well not have been there for all the barring it did of intruders on the course. The Pinkertons, deputies, and the Irish Brigade soldiers apparently were utterly insufficient in number or incapable for the purpose. The guardsmen that had volunteered to furnish the military feature of the track's protection paid more attention to cheering the racers and keeping their score cards straight than to the serious task they had undertaken. They were hardly a bit more efficient than were the soldier boys with their little sticks that afforded such humorous policing at the Briarcliff race. If it be impossible to secure State military co-operation in policing future Vanderbilt races, then it would seem necessary to erect a high, stout, barbed-wooden fence along the home-stretch, well guarded from invaders at either end, and leave

Industry Well Represented.—The automobile industry was well represented in the throng that saw the race. Among those to be seen were: E. R. Thomas and H. S. Houpt, of the E. R. Thomas Motor Company; S. T. Davis, Jr., A. L. Riker, J. C. Kingman, and J. T. Plummer, of the Locomobile Company of America; Paul LaCroix, of the Renault Frères branch; Henry P. Joy, Russell Alger, and M. J. Budlong, of the Packard Motor Car Company; S. A. Miles, general manager of the N. A. A. M.; Alfred P. Reeves, general manager of the A. M. C. M. A.; E. P. Chalfant, assistant manager, and Coker F. Clarkson, of the A. L. A. M.; A. C. Newby, of the National Motor Vehicle Company, Indianapolis; John N. Willys, Overland Automobile Company, Indianapolis; R. M. Owen, New York City; Col. George Pope, Hartford; J. R. Maxwell and Benjamin Briscoe, of the Maxwell-Briscoe Motor Company; C. W. Matheson, of the Matheson Motor Car Company; Henry Ford and Gaston Plantiff, of the Ford Motor Company; R. D. Garden, New York Pierce manager; C. A. Singer, of Palmer & Singer; E. H. Brandt, Cadillac Motor Car Company; John Rainier, New York City; Joseph Gilbert, Continental tires; Windsor T. White, Cleveland; A. M. Robbins, Chicago; George Johns, A. H. Whiting, and a long list of others.

Auto Clubs Had Delegations.—Several of the largest A. A. A. clubs had special parties to the race. Nearly a hundred from the Automobile Club of Buffalo, with D. H. Lewis in charge, had a special sleeper from Buffalo, and it was sidetracked near the grandstand. Another carload came from the Automobile Club of Germantown, and this car was also tracked in the vicinity of the grandstand. The Automobile Club of Hartford had a run to the cup course, participated in by over two score of cars, and the party included Governor Woodruff, of Connecticut. Two large tents were erected for sleeping quarters at the club's parking place a short distance below the grandstand. The fact that a Nutmeg State car won the race could not fail to be a source of great satisfaction to the Connecticut contingent. The Long Island Automobile Club had a big parking space, near the grandstand, and it included a tent wherein refreshments were available to members and friends.

Building of Motor Parkway to Be Resumed Next Spring.—"The Parkway," said A. R. Pardington, "is a tremendous piece of work. It is wonderful to think that it was rushed through in only two years. They were two years of the hardest work of my life. Here we have nine miles fully completed and the rights of way for sixty more. Up to this time $900,000 has been spent, and there is $1,500,000 more to spend when work is resumed. And it will be spent. By this time next year the parkway will be completed to Lake Ronkonkoma, about thirty-five miles in all. We hope in time to hold such races as the Vanderbilt entirely on our own property."

Great Joy Over American Victory.—The enthusiasm over the race being won by an American car was sincerely and unmistakably shown by the wholesouled cheering at the finish. "I am glad an American car won," said W. K. Vanderbilt, Jr., to one of the first that shook his hand after the race. "It was a disappointment to lose," said Herbert Lytle, "but I am glad an American car won." "I'd give five hundred dollars to see that American car win," said Henry Ford excitedly in the midst of the doubt of the last lap.

Chadwick Ran Most Consistently.—The consistent and even running of the Isotta throughout was remarkable, but it did not compare with the consistency and evenness of the running of the Chadwick up to the time that trouble and disaster befell the American car. This is proved by Haupt's times for the first four laps, which were 21:29, 21:27, 21:26, and 21:36, an average that varied only a small fraction from 66 miles per hour each of these rounds.

It Was Tantalizing, Indeed.—It certainly was tantalizing to the man that came in an automobile to see that monster grandstand rising from out of the plain and then have to ride miles to find a road that might possibly lead to a path that might eventually get his car and passengers to the haven they were seeking. On that vast prairie there will certainly be plenty of land for the building of a loop when the parkway is completed.

Should Be Provision for "Bleacherites."—In discussing the mistakes and omissions of the first race over the parkway, Chairman Thompson said that one reason for the crowd's overrunning the homestretch was that no provision had been made to furnish moderate priced seats and bleachers for the general public. He thought that had the home stretch been lined with such seats there would have been little or no trouble.

Fooled by Headlights.—The search for the grandstand at night was a really serious matter for hundreds of automobiles. There were many advertising arrows tacked on the fences, but they could not be seen in the dark. It had been announced that the grandstand would be lighted and scores of cars plowed their way across meadows only to find that they had been fooled by the lights of a squadron of campers.

Might Have Waked the Sleepers.—The homecoming on the Long Island Railroad certainly tried men's souls. The time from the grandstand to East Thirty-fourth street ferry varied from 2 1-2 to 3 hours. A large portion of the passengers had made a night of it and were asleep. A wag suggested that the trains were run slow so as not to wake the sleepers.

Harvest for Fakers.—The souvenir fakers did a rushing business. A majority of the cars returned to town with little flags bearing a Vanderbilt Cup or an automobile with "Vanderbilt Cup" inscription. In the returning trains were hundreds of papas who had bought them to take home to the kiddies.

Wagons as Grandstands.—Farmers were out by scores in their big truck wagons, which they converted into grandstands, selling the seats. The wagon drivers, by the way, did not all leave their lanterns hang under the running gear as usual, but many of them waved them in warning to avoid collision.

Feared a Big Wind.—The blackboards were a bit small, but the commission feared should a strong wind sweep across Hempstead Plain on the day of the race it would demolish larger expanses of boards. At the Grand Prix a skeleton score board was used, the numbers being hung on hooks.

Had Not the Soldiers Been Late.—If the soldiers had arrived at the parkway an hour or two earlier than half-past five o'clock, they might perhaps have headed off the vanguard of the fence-climbers and prevented the crowd from preempting the homestretch.

Avoided Garden City Hotel.—While the Garden City Hotel was crowded it was not packed to the porches as at previous cup races. Hundreds had no hope of securing a bed or a cot and had camped out all night without making the attempt.

"Greatest Ever," Says Reeves.—"It was the greatest Vanderbilt race ever run," said Alfred Reeves, general manager of the A. M. C. M. A. "I didn't think that such a bunch of comparatively old cars were good for such a performance."

Two Notable Bostonians.—Charles J. Glidden, of touring and airship fame, and Henry L. Bowden, who made the world's mile record at Ormond with his *Flying Dutchman*, were among the notable Bostonians at the race.

"Van" Toured to the Race.—N. H. Van Sicklen, former chairman of the A. A. A. Technical Board, saw the race. He had driven to the course with his wife from Chicago in his Apperson Jackrabbit.

Lingerie on View.—Women took advantage of the darkness to scale the parkway fence. Occasionally headlights happened to be turned in their direction, adding to the gaiety.

Seventy Miles an Hour Easy.—"Lighter cars with shorter wheelbase could easily make 70 miles an hour over this course," remarked Foxhall Keene after he had retired from the race.

STRANG WILL DRIVE AT NEW ORLEANS.

NEW ORLEANS, Oct. 24.—Louisiana automobile enthusiasts are making great preparations for two days' racing carnival scheduled for November 7 and 8 at the Fair grounds. All the local dealers are entering into the plans of the promoters in a way which speaks much for the success of the meeting and through their efforts many of the factories are preparing to come to the aid of their agents with machines and drivers. Strang has signified that he will be on hand with his Vanderbilt entry and a stock car in order that he may enter not only the special events, but those for stock cars as well.

The Winning Locomobile Making a Spectacular Crossing of the Westbury Bridge.

This is an authentic and copyrighted photograph taken by R. W. Tebbs, of Brooklyn. Note the fact that all four wheels are off the ground, though the left rear wheel appears to be resting on something, that something really being the branches of a tree which happen to intrude themselves into the view. The photographer exhibits the negative to prove that the camera told the truth.

THE LEGITIMATE ZONE OF THE CHAIN.

Editor THE AUTOMOBILE:

We are surprised at the statements in your editorial in the issue of October 8, 1908, wherein you undertake, at one swoop, to eliminate the chain-driven car. If your journal is entirely a general magazine for the public, and reflecting only the public ideas of design, you have done well by representing only a portion of the public who are interested in automobiles. If your journal is a trade paper, as you claim, you have then made the mistake of making statements which are not borne out by facts, i.e., that shaft drive is now universal, or so nearly so that the statement could apply, thereby antagonizing the interests and convictions of a very large number of substantial manufacturers of chain-driven cars.

As evidence that the shaft drive is not universal, I have selected 127 manufacturers of automobiles who are really producing cars in reasonable quantity. Of these 127 manufacturers

59 make shaft drive only,
19 make both shaft and chain drive,
49 make chain drive only;

12 of the 49 make double chain drive, and 3 of the 19, makers of both shaft and chain drive—use double chains. These three are Apperson Brothers, Locomobile Company and E. R. Thomas Motor Company. The last two are the only double chain drive makers who have yielded to the public's (?) demand for a light gear-driven car. They still supply the chain drive also. These two are the only important makers who have made the change recently, while to read your editorial, one would think the whole tide had turned to shaft drive.

Your editorial is criticized by the makers of chain-driven cars as extravagant, misleading, and not borne out by facts. We feel that your position toward the trade and the public should be fair and unbiased, and if you find that it is necessary to discourage the chain drive proposition, stick to facts or arguments.

The real fact is that the number of new chain drive cars made in 1908 exceeded any previous year—and the 1909 production will in numbers almost double those made in 1908. The number of makers of chain drive cars who have changed to gear drive for 1908 is smaller than in any previous year, and the objection to chain drive by the public, and especially by the engineer, is less than ever.

The public has no doubt been the final court in the decision against chain drive—formerly they had good cause. The size of chain and sprockets, construction of the car, and the inordinate conditions under which chains were operated, caused many chain troubles, and the public naturally condemned chain transmission. The only remedy with numerous makers seemed to be that they at once change to shaft drive. In the meantime, a few makers set about to better the conditions, with the result that where the conditions are harmonious with scientific principles and laws, the chain is far more efficient, less expensive to maintain, and with less cost for upkeep of tires than is possible with the shaft drive. The public, the engineer, and the designer will appreciate this more and more, and, by natural evolution, chain drive will continue to grow in general favor.

We are pleased at the good, healthy growth of the business. We do complain of the wholesale manner in which you undertake to eliminate the chain drive, and thereby antagonize the many high class manufacturers, and the thousands of individuals, whose opinion and preference is, and will continue to be, in favor of chain drive.

DIAMOND CHAIN & MFG. CO.,
Indianapolis, Ind. L. M. Wainwright, Pres.

Your letter constitutes a fine "brief" in favor of chains. The editorial you comment upon is not, in view of the previous discussions, a stricture on side chain drives for powerful automobiles. What we said was: "It is quite probable, however, that the shaft will, sooner or later, displace the single chains, now employed on some light cars." Otherwise we reflected what can only be construed as the positive trend, *i. e.*, the light touring cars and the runabout types are adequately provided for by way of the shaft drive, which provision was seriously questioned by many, *in the past.*

This is not to say chains are not capable when it comes to light cars; indeed, it is wholly unnecessary to point out that chains are used in the cars of great power, because the chains are of undoubted ability; whereas, the shaft drive has not, as yet, been proven as equal to the occasion.

In view of these facts, we properly refrain from giving space to well understood facts and confine our reflections to the matters long under serious discussion, but now quite clear, and we repeat, the shaft drive is entitled to respect and confidence, within the zones of its common application, which is no reflection on the chain and its proven ability. The public will, of course, decide in the long run the extent of the respective applications. We will record the facts and reflect the trend.

BUSY TIMES PREVAIL IN TIRETOWN.

AKRON, O., Oct. 25.—The extensions that the Akron rubber companies engaged in the manufacture of tires are making this year and preparing to make this coming year are little short of marvelous in their magnitude. Announcement has already been made of the two big buildings to be erected by the B. F. Goodrich Company as additions to its local plant besides the branch in New York City to cost over a million dollars.

One of the most important recent announcements of proposed extensions was made this week by the Firestone Tire & Rubber Company, which announces the purchase of the plant of the Globe Foundry & Machine Company, which adjoins the rubber company on the north. Plans will be soon prepared for the erection of an immense factory on the site of the new property. Secretary S. G. Carkhuff is authority for the statement that the new building will be put up next spring, and it will exceed the addition now under construction, which is 125 feet long, 50 feet wide and four stories high. The property that has been purchased by the company consists of five lots containing several buildings. The extension is due to the growth in the tire business.

The Firestone additions make ten new factory buildings that are to be constructed by local rubber companies for the extension of their business, announcement of which has been made within the last few months.

The first definite statement was made this week by the Diamond Rubber Company as to what additions it will make since the city council has vacated an important street for the benefit of the company. Owing to the increased demands for tires, the Diamond company will make additions in order to practically double its tire output. Two large buildings will be constructed on new land that has been purchased. The first one, to be erected at once, will be 300 feet long, 100 feet wide and one story high. This is to be completed by the end of the year. Following it the company will erect a five-story building of the same ground dimensions as the one-story building. An overhead bridge will connect the present plant and the new one.

The B. F. Goodrich Company is establishing four new branch houses in addition to the 14 now in existence. The new branches are to be in Kansas City, Atlanta, Minneapolis and Pittsburg. At present tires alone will be sold at these branches, but in future all of the company's products will be distributed.

The Diamond Rubber Company at its annual election this week chose the following directors: C. A. Lake, Chicago; O. C. Barber, F. A. Hardy, A. H. Marks, W. B. Miller and O. S. Hart, Akron, Mr. Hart succeeding E. K. Hardy, who resigned. The directors chose the old officers again as follows: President, F. A. Hardy; vice-president, A. H. Marks; secretary, W. B. Miller; treasurer, A. H. Noah.

Having six of the nine American cars in the Vanderbit race Saturday equipped by Diamond tires, the Diamond Rubber company was well represented at the contest. Those present were A. H. Marks, W. B. Miller, J. A. Braden, J. D. Tew and C. B. Myers, the last named being the company's best tire expert.

H. S. Firestone, president of the Firestone Tire & Rubber Company, is at present in the West visiting the company's agencies and investigating business conditions as it pertains to the tire trade. He will visit the leading cities on both sides of the Rockies, and will be home in two weeks.

FAIR QUAKERESSES HAVE A MANLESS RUN.

PHILADELPHIA, Oct. 26.—The annual run of the Ladies' Quaker City Motor Club took place last Wednesday over a course laid out from this city to Lakewood, N. J., and return, a distance of approximately 130 miles. A score of this city's fair automobile enthusiasts took part in the run, which was led by President Mrs. Joseph J. Martin in her big Mercedes. Mrs. G. A. Reach drove her six-cylinder Stevens-Duryea, Mrs. Herbert B. Knox drove her Royal Tourist, and Mrs. S. E. Bailey drove a Pullman.

AMERICAN CARS IN SOUTH AMERICA.

After a trip of close to six months, during which time he has been traveling through South America in the interests of the Dayton Motor Car Company, Dayton, O., manufacturers of the Stoddard-Dayton cars, Sigmund Kraus has just returned from Buenos Aires, via Lisbon and Paris, and reports an excellent market below the equator for American built automobiles. Prior to making his South American trip, Mr. Kraus showed the paces of the Stoddard-Dayton to the auto enthusiasts of Habana, where the car met an unusually favorable reception. After returning from Cuba he sailed from New York on May 1, stopping at Bahia, Rio de Janiero, Montevideo and Buenos Aires, agencies for the car being established in the three last-named cities.

"South Americans are strongly prejudiced in favor of European built cars," said Mr. Kraus when seen prior to departing for the factory at Dayton, "and with good reason, for the first American cars sent down there were certainly not of the kind to build a reputation on—at least not a good reputation—and they only served to give American automobiles a black eye. But the fine construction, graceful lines, and, above all, the silent running and snappy action of the Stoddard-Dayton impressed them very favorably, so that I not only had no difficulty in disposing of the twelve sample cars that I took along with me, but took orders for several more besides. Business conditions in South America are not at their best by any means just now, and the credit system current there is another drawback to the introduction of a new car, but for all that there is a good market for the medium priced car of American make. The same thing is true of Europe, and even of France itself, in my opinion."

After spending a short time at the factory Mr. Kraus will make a trip through Mexico in the interests of the Stoddard-Dayton, establishing agencies in the principal centers, and will later cover Europe in the same manner.

POPE REORGANIZATION NEARLY COMPLETED.

HARTFORD, CONN., Oct. 26.—According to the statement given out by A. L. Pope, one of the receivers of the Pope Manufacturing Company, the plan of reorganization of the company is now but a matter of a short time until the matter can be put through the various courts. The plan of reorganization includes the deposit of first and second preferred stock and the issue of $800,000 of notes. About 98 per cent. of the first preferred stock and approximately 90 per cent. of the second preferred stock has been deposited with the reorganization committee. Of the notes needed a large part have already been subscribed by the stockholders, and if any remain unsubscribed this week underwriters will meet the situation at once. The total debts of the company were about $1,700,000, of which 75 per cent. has been paid out of the profits of the past year and by the sale of various properties not used by the company. The profits of the Hartford and Westfield factories during the past year amount to about $400,000.

BOSTON SHOW APPLICATIONS OPEN.

BOSTON, Oct. 26.—Application blanks for space in the Seventh Annual Boston Automobile Show, to be held in Mechanics Building, March 6-13, 1909, have just been issued from the office of Manager Campbell. For the coming show there will be available 105,000 square feet of space divided among seven departments, with nearly 600 spaces. As in the past the management of the show will take care of the decorations and the furnishings of all spaces, the cost of the space including these things as well as the rental. The cost of signs is also included and these will be uniform in character. The prices of automobile show spaces in the pleasure car department range from $750 to $100 each; in the other departments the space is to be sold at a fixed price per square foot. Already Manager Campbell has a large number of applications on file, and the first allotment of space will take place the first of next month.

NEW ISSUE OF AUTOMOBILE TRADE DIRECTORY.

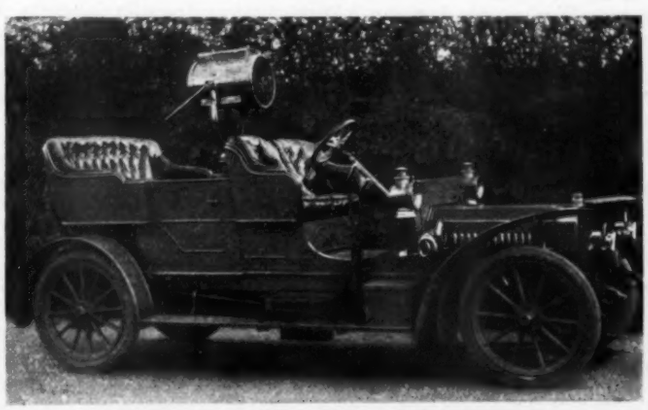
As the result of several years' constant application, the third quarterly edition of The Automobile Trade Directory for the present year, which has just been issued under date of October, 1908, comes as near to being a complete index of the automobile industry and its legion of allied industries as it is possible to compile. The object all along has been to make The Automobile Trade Directory a valuable aid to the purchasing agent, the engineer and the factory superintendent, and, in furtherance of this, a new department has been incorporated, giving classified lists of manufacturers of machine tools and other shop equipment suitable for automobile work. This has been done at the suggestion of a number of engineers and buyers, and, as the section devoted to it comprises no less than 72 pages, its value may readily be appreciated.

The main portion of The Automobile Trade Directory is devoted to lists of manufacturers of every part, accessory and material that enters into the manufacture of an automobile, and, as an illustration of its completeness, the fact may be cited that its range comprises everything from a lamp wick to a complete car, and the information is not only put in the most accessible and concise form, but by a system of cross references, under which both the trade name of an article as well as its maker, is listed, it is easy to locate practically any manufacturer supplying the automobile trade. The entire list has been completely revised right up to the date of issue. In addition to this information, it also contains a great deal of engineering data that is of great value to both the purchasing agent and the engineer, and the presence of which in The Automobile Trade Directory makes reference to other works unnecessary.

NEWS OF THE PALACE SHOW.

The National Retail Automobile Dealers' Association has selected the Ninth International Automobile Show in Grand Central Palace as its headquarters in New York during exhibition week, which opens New Year's Eve and runs until January 7th. The Association is made up of the dealers and agents for leading American cars. Following this decision, the A. M. C. M. A. management of the Palace affair volunteered to provide accommodations for all who attend. The president of the Association is C. F. Jensen, Joliet, Ill., while J. A. Crum, secretary, is located at Oshkosh, Wis. Mr. Crum will have personal charge of the headquarters at the Palace.

Associated with L. M. Bradley, manager of the publicity department of the American Motor Car Manufacturers' Association, will be Charles E. Duryea, one of the best known mechanical engineers in this country.



Rushmore Searchlights for the British War Office.

The British War Office recently had a touring car fitted with a powerful electric searchlight by the London branch of the Rushmore Dynamo Works. The lamp contains a standard 14-inch projector, and, as shown in the photograph, is mounted at a considerable elevation so as to command a wide radius. The car carries a five-kilowatt dynamo, which may be connected with the motor by a clutch. The combination has been found very successful in the night maneuvers of the army, and it is possible that several more of the same type may be ordered.

A Stoddard-Dayton Victory in a California Track Event.

A Good Advertiser.—That A. W. Harris, of the Harris Oil Company, of Providence, R. I., is a believer in liberal advertising was shown by the Motor Parkway Sweepstakes program in which he purchased the entire advertising space. Mr. Harris happened to be the first man seen by the advertising man for the printing company, and he immediately bought all the available space. The fact that Harris oil was so much in evidence, not only on the competing cars, but in the official program, was the subject of many remarks by the spectators.

Testimonials for the Locomobile Drivers.—Recognizing the personal element in any race, as well as the quality of the tires, the Firestone Tire & Rubber Company has presented to Robertson and Florida, the drivers of the two Locomobiles in the Philadelphia race on October 10, with souvenir cups, and the mechanics, Ethridge and Connelly, medals, to show the appreciation of the company of the way in which they utilized Firestone tires during the race.

Tour of the Brush Runabouts.—The Brush Runabout Company, of Detroit, is about to put out a small booklet describing the various experiences of the five cars sent out from Detroit in August for Boston, Washington, Denver, Milwaukee, and Minneapolis. The book will be well illustrated with views taken in the different sections passed through by the five cars, showing the widely varied conditions met with.

IN AND ABOUT THE AGENCIES.

Olds, Pittsburg Branch.—The Olds Motor Works, of Lansing, Mich., has established a factory branch in Pittsburg under the management of J. V. Hall, who was formerly Oldsmobile salesman for the State of Ohio. Commodious headquarters have been secured at No. 5922 Baum street. It is planned to make Pittsburg the distributing point for all Olds cars sold in western Pennsylvania, the State of West Virginia and all the northwestern portion of the State of Maryland. This includes some thirty sub-agencies, who heretofore were handled through dealers. The agents will now handle the Oldsmobile line as a direct agency proposition.

Stepney Spare Wheels, Chicago.—The retail store of the Stepney Spare Wheel Company, 236 Michigan avenue, has been closed, and the company has established a branch house with the Excelsior Supply Company, 233-237 Randolph street, for the control of the Middle West. The other branches are as follows: Eastern territory, 1773 Broadway, New York City; Western territory, Auto Spare Wheel Company, Kansas City, Mo. Sales Manager George S. Morrow will divide his time between the three branches, and look after the company's exhibits at the coming shows.

Hyatt Roller Bearings, Detroit.—The Hyatt Roller Bearing Company, of Newark, N. J., will open an office in the Majestic building, that city, at which Peter S. Streenstrup, the general sales manager, will make his headquarters after November 1.

Pittsburg Auto Tire Repair Company, Pittsburg.—The quarters formerly occupied by the Fisk Rubber Company, at the corner of Baum and Beatty streets, have been leased by this concern, which will take possession November 1.

Apperson, Kansas City, Mo.—The Pioneer Motor Car Company, 3028 Gillham road, with Charles Dinklage, formerly of the Kaw Valley Auto Company as manager, will handle the Apperson line for the coming season.

Empire Tires, Pittsburg, Pa.—The Consumers' Auto Supply Company, Seventh avenue and Smithfield street, has been appointed agent for Pittsburg and vicinity by the Empire Automobile Company, of Trenton, N. J.

White and Pierce, Pensacola, Fla.—A company has been formed by W. A. Gahlenbeck, of Pensacola, and E. E. Wager, of the Southern Automobile Company of Mobile, to handle the Pierce and White cars for 1909.

White, Chattanooga, Tenn.—The newly formed Crescent Automobile Company, of Chattanooga, Tenn., has taken the agency for the White steamer and opened up a garage and salesroom at 18 Williams street.

Franklin, Kansas City, Mo.—The Franklin interests in Kansas City will be looked after by Lewis A. Robertson, who has incorporated a selling company and is making full preparations for a busy season.

Stoddard-Dayton, Scranton, Pa.—Conrad Brothers, of Scranton, Pa., have closed a contract with the Dayton Motor Car Company to represent the Stoddard-Dayton cars in that territory.

Remy Magneto, New York City.—The Remy Electric Company, of Anderson, Ind., has opened a New York office in the Thoroughfare building, Broadway and Fifty-seventh street.

PERSONAL TRADE MENTION.

Zenas Carter has been appointed manager of the publicity bureau recently established by the Pettingell-Andrews Company, Pearl street and Atlantic avenue, Boston. Mr. Carter has had 10 years' experience in the printing and advertising fields, and will have entire charge of the company's automobile and electric specialties departments. A new 16-page catalogue with an exceptionally artistic cover attests the energy of Mr. Carter in getting quickly to business. The new book is called "Ignition," and lists the "J. & B." coils, vibrators, switches, spark plugs, and other specialties for which the company is agent.

Sidney B. Bowman, of the Sidney B. Bowman Company, New York City, accompanied by his superintendent, John F. Merk, sailed Tuesday on the *Cecile* for his annual trip to the Clement-Bayard factory, Paris. Just before sailing a committee representing the seventy-five employees waited upon Mr. Bowman, wished him a pleasant journey and safe return, and accompanied the compliments with a floral horseshoe. Mr. Bowman intends to return in time for the Savannah race, in which he has two Clement-Bayards entered.

Charles H. Bauer has resigned from the Studebaker Company to assume the sales management of the Austin Automobile Company, of Grand Rapids, Mich., which concern's output of six-cylinder cars will be greatly increased for the coming year. Mr. Bauer is well known to the automobile trade, having been connected with the Electric Vehicle Company, Hartford, Conn., previous to his Studebaker connection.

J. J. Mann, managing director of the Societe Anonyme des Automobiles Delaunay-Belleville, of Paris, has just arrived in this country for the purpose of making American arrangements for his company. Mr. Mann formerly had Hotchkiss connections and is well known on this side.

Charles C. Craig, sales manager of the Model Automobile Company, Peru, Ind., maker of the Great Western cars, is on an Eastern trip in the interest of the company's 1909 product, which will be equipped with four-cylinder motors.

Claude H. Pratt, who has been the Fisk representative for Ohio and West Virginia for some time, is now manager of the Cleveland branch, succeeding C. H. Gage, who has accepted a position at the factory.

IMPORTANT CLEVELAND DEAL.

CLEVELAND, Oct. 26.—The local field is about to see one of the greatest changes of recent years, for, following the announcement of the Studebaker-Garford combine, comes word that the Metropolitan Motor Car Company, local Pierce and Knox agents, has been absorbed by the Studebaker-Garford combine. This change, which has been under consideration for some time, involves the taking over of the garage of the Metropolitan Motor Car Company on East Nineteenth street, near Euclid avenue, by the new combination under the management of A. R. Davis, secretary of the Garford company. The entire garage will be changed to meet the new conditions.

The new concern will also sell the E-M-F, as well as the Studebaker electric (both pleasure and commercial vehicles). In addition the entire garage and repair shop service of the Metropolitan will be continued, so that there will be four departments in the new concern. A. E. Foss, well known to the trade, will continue as superintendent of the garage.

In addition to his local business, Mr. Davis will also have a great deal of State territory to cover, and he has selected Joseph D. Porter, formerly New York manager of the Wayne, to look after the outside interests for him. Porter will have charge of all outside territory for the Studebaker-Garford, Studebaker Electric, and E-M-F, working under the general direction of Mr. Davis.